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For: **ELECTRONIC CHECK PRESENTMENT WITH IMAGE INTERCHANGE
SYSTEM AND METHOD OF OPERATING AN ELECTRONIC CHECK
PRESENTMENT WITH IMAGE INTERCHANGE SYSTEM**

Commissioner for Patents
P.O. Box 1450
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Sir:

The following reference(s) was/were cited in a Report conducted with regard to a non-U.S. patent application corresponding to the subject U.S. patent:

AMERICAN BANKERS ASSOCIATION: "AMERICAN NATIONAL
STANDARD ANSI X9.37 – SPECIFICATIONS FOR ELECTRONIC CHECK
EXCHANGE – ABA", AMERICAN NATIONAL STANDARD FOR
FINANCIAL SERVICES, XX, XX, 6 April 2001, page 1, XP008074624

WO 93/02424 A

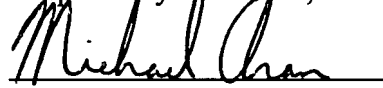
US 5,678,046

AMERICAN BANKERS ASSOCIATION: "AMERICAN NATIONAL
STANDARD ANSI X9.46 – AMERICAN NATIONAL STANDARD FOR
FINANCIAL IMAGE INTERCHANGE: ARCHITECTURE, OVERVIEW AND
SYSTEM DESIGN SPECIFICATION", AMERICAN NATIONAL STANDARD
FOR FINANCIAL IMAGE INTERCHANGE: ARCHITECTURE, OVERVIEW
AND SYSTEM DESIGN SPECIFICATION, XX, XX, 21 January 1997, page 1,
XP008074623

A copy of the Report is enclosed herewith. Also a copy of the above-named non-US references and publication(s) is/are enclosed for the convenience of the Office.

It is requested that this Report be placed in the patented file.

Respectfully submitted,



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**AMERICAN NATIONAL STANDARD
FOR FINANCIAL IMAGE INTERCHANGE:
ARCHITECTURE, OVERVIEW, AND
SYSTEM DESIGN SPECIFICATION**



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Accredited Standards Committee
X9 - Financial Services

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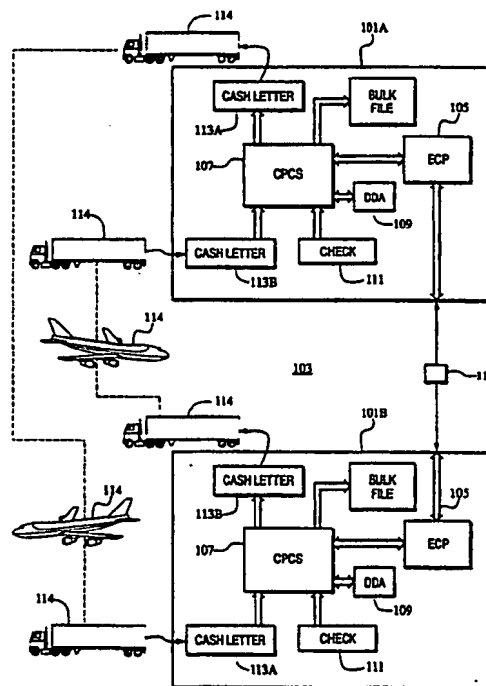
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<p>(21) International Application Number: PCT/US92/05780</p> <p>(22) International Filing Date: 10 July 1992 (10.07.92)</p> <p>(30) Priority data: 731,529 17 July 1991 (17.07.91) US</p> <p>(71) Applicant: J.D. CARREKER AND ASSOCIATES, INC. [US/US]; 5550 LBJ Freeway, Suite 700, Dallas, TX 75240 (US).</p> <p>(72) Inventors: STEPHENS, Thomas, S. ; 14719 Sherlock Drive, Addison, TX 75244 (US). MILLS, Daniel, R. ; 4409 San Andreas Avenue, Los Angeles, CA 90065 (US). SHERMAN, Richard, A. ; 7 Sullivan Court, Marlboro, NJ 07746 (US). DROLLINGER, Harry, B. ; 460 Horseshoe Trail, McKinney, TX 75069 (US). ANDERSON, George, B. ; 2 Tower Road, Freehold, NJ 07728 (US).</p>	<p>(74) Agent: HUBBARD, Marc, A.; Hubbard, Thurman, Tucker & Harris, 13355 Noel Road, Suite 2100, One Galleria Tower, Dallas, TX 75240-6604 (US).</p> <p>(81) Designated States: CA, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LU, MC, NL, SE).</p> <p>Published <i>With international search report.</i></p>	

(54) Title: ELECTRONIC CHECK PRESENTMENT SYSTEM

(57) Abstract

An Electronic Check Presentment System provides a bank with a fully automated capability for participating in the electronic exchange of check data. It allows banks that utilize the system to take MICR data that has been obtained through check capture methods (107), selectively extract particular check records and place them in the form of electronic cash letters (105), transfer (115) the electronic cash letters to selected banks, receive electronic cash letters from other banks, reconcile the electronic cash letters (105) against the paper cash (113A, B) letters when they arrive, and input the electronic MICR data into a database (107) responsible for maintaining check records.



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ELECTRONIC CHECK PRESENTMENT SYSTEM

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5 whatsoever.

Technical Field Of The Invention

This invention relates to the field of electronic check processing, and more specifically, to a data processing methodology and apparatus that allows all banks that utilize this invention to electronically transfer and receive check information.

10 Background Of The Invention

For some time, banking institutions have handled the presentment of checks for payment in a manual fashion. At a specified time each day, a bank sorts all checks presented to it into bundles, with the bundles pertaining to particular banks on which they are drawn (the "drawee bank"). As the checks are sorted for particular destination
15 banks, they are gathered into batches of about 300 checks. One or more of these batches are then aggregated for shipment to the destination or "payor" bank. A cover letter is attached to each shipment of checks that summarizes the contents of the shipment. Such summary information comprises the name of the payor bank, a number associated with the name of the drawer bank (called the routing transit number), the
20 number of checks in the shipment and the total dollar amount of all of the checks in the batch. The cover letter is termed a Cash Letter. The presenting bank then transfers to the payor bank the "Cash Letter", which includes the cover letter and the bundle of checks.

When the drawee bank receives the Cash Letter, it verifies that the contents of
25 the cash letter, i.e., the checks, agree with the totals contained on the cover letter. The bank also determines whether enough money exists in the payor customer's

account to cover payment of the check, and either accepts or rejects payment of the check. The payor bank then notifies the presenting bank regarding any balancing discrepancies or any items which are to be returned.

The above procedure is an over-simplification of the process established for clearing checks between banks. However, it is sufficient to demonstrate the problems associated with such a process. A first problem resulting from the above process is the delay between the time a check is first deposited at the presenting bank and the time the drawee bank accepts or rejects the check. The payor bank has the choice of either placing a hold on the depositing customer's bank account until it is notified of acceptance by the payor bank, or it pays out the money to the presenter and incur the risk that the check will be rejected by the drawee bank.

Many banks choose not to incur such a risk, and therefore place a hold on the presenter's bank account until it is notified that the check has been accepted. However, the time that it takes for the payor bank to be notified that a check has been accepted or rejected may take as long as 7 to 10 days. The Expedited Funds

Availability Act of 1987, however, places limits on the length of time that a bank may retain a hold on a customer's funds. In most cases, only two days are allowed for local items, and only three days for non-local items. These time limits can severely expose a bank to risks of loss and fraud by forcing a bank accepting customers deposits to release funds to that customer prior to verification that those funds are, in fact, collectable from the payor institution.

To overcome the problem of delay, banks have attempted to automate the process of gathering checks into cash letters, sending and receiving cash letters, and reconciling these cash letters against their contents. Such attempts at automation have included the installation of check sorter machines that scan checks at very high speeds, and sort these checks into bundles associated with payor banks. The sorter "reads" information contained on the checks such as the routing transit number, the drawer's account number, the check number and the amount of the check. This information is stored in a line of symbols at the bottom of each check in MICR (Magnetic Ink Character Recognition) form. Check sorter machines have been used quite successfully and are well known in the art.

Another attempt at automating the check process is the use of computer systems to record and manage the information associated with the check sorting procedure. Such computer systems interface with the check sorter machines and allow the computer systems to build database information associated with each check that is read.

- 5 This allows an operator of a computer system to obtain information on checks that have been read such as the total number of checks drawn on specific banks and the total dollars of all checks drawn on specific banks. One such system that accomplishes this task is the IBM CPCS (Check Processing Control System).

- 10 Although both of the above attempts have benefitted the banking industry, they have failed to address the problem of delay associated with the transfer of cash letters between banks. Better transportation, overnight express, and other services have helped to improve the transfer of cash letters, but the transfer of the information contained in the cash letters has still been dependent on the physical delivery of the cash letters to the drawee bank. Such dependence on the physical transfer of the cash
15 letters perpetuates the delay associated with acceptance or rejection of particular checks.
-

- Another problem associated with the transfer of cash letters between banks is the inability of either bank to specify, for identification purposes, a particular check that was sorted by the other banks system. As each check is captured on the check
20 sorting machines, a micro-film image is captured, and a unique "item sequence number" is assigned by the CPCS system. The system then maintains a database of item sequence numbers so that it can later identify and find individual checks within the numerous rolls of micro-film. However, since each bank assigns its own item sequence numbers, there is currently no way for one bank to cross reference its own
25 item sequence number to that of another bank.

- Although means have come into existence that allow for wire transfer, or electronic transfer of funds from banks, *see* Deming, U.S. Patent No. 4,823,264 and Case, U.S. Patent No. 4,270,042, these systems have dealt with transfer of funds between a bank and an individual user. No system to date has allowed banking
30 systems to electronically transfer, and control the transfer of, the large volume of checks deposited in their institutions every day.

Summary of the Invention

It is therefore an object of this invention to provide a way for banks to electronically transfer cash letters and improve the delay resulting from physical transfer.

- 5 An additional objective of this invention is to provide banks with a method for minimizing its risk of exposure to check loss and check fraud due to the legal limits placed upon banks for placing a hold on the funds of their customers.

- Another object of this invention is to allow a bank that utilizes electronic check presentment to reconcile the received electronic cash letters against the physical paper
10 cash letters when they arrive.

A further object of this invention is to allow both the depositing bank and the paying bank to re-associate the item sequence numbers assigned by both banks, and by the electronic check presentment system, to allow for easy cross-referencing.

- An additional object of this invention is to provide for electronic check
~~15 presentment without changing the existing methodology associated with paper check~~
presentment.

A further object of this invention is to utilize existing check databases and check sorting machines in the electronic check presentment process so as to minimize the impact on present check presentment procedures.

- 20 The Electronic Check Presentment System provides a bank with a fully automated capability for participating in the electronic exchange of check data. It allows banks that utilize the system to take MICR data that has been obtained through check capture methods, selectively extract particular check records and place them in the form of electronic cash letters, transfer the electronic cash letters to selected banks
25 via existing computer-to-computer data transfer technology, to receive electronic cash letters from other banks, reconcile the electronic cash letters against the paper cash letters when the physical paper items arrive, and input the electronic MICR data into a database responsible for maintaining check records.

- The Electronic Check Presentment System uses electronics to move check
30 information efficiently between presenting and paying banks, and improves the collection and return processes by the amount of time required for transportation of the checks between banks and by allowing banks to debit customer accounts from

electronically received items. Depositing banks begin the funds collection process by transmitting MICR line information while continuing the presentment of the physical checks via ground and air transportation. Checks deposited on a Monday can be presented electronically to the paying bank anywhere in the country that same evening.

- 5 Because electronic check presentment can be completed faster than physical check presentment, the check presentment process can be accelerated by at least one day.

To this end, the applicant has initiated the formation of ECCHO (Electronic Check Clearing House Organization) as a cooperative venture to implement electronic check presentment. The organization has designed a standard ECCHO format that
10 mirrors a paper cash letter with detail records (checks) and summary records (batches and cash letters). When the presenting bank produces a paper cash letter, it also creates an electronic cash letter from its existing check capture files to send to the paying banks. After the paying bank receives and captures the paper checks, it then reconciles the paper checks with the electronic items.

15 **Brief Description of the Drawings**

FIGURE 1 is a schematic representation of an electronic check presentment system.

FIGURE 2 is a schematic representation of a send sub-system for the electronic check presentment system.

- 20 **FIGURE 3** is a schematic representation of an alternate embodiment of the send sub-system.

FIGURE 4A is a schematic block representation of a preprocessor for operation in a receive subsystem of the electronic check presentment system.

- 25 **FIGURE 4B** is a schematic block representation of paper-less MICR capture operation in the receive sub-system; the paper-less MICR capture process will allow the CPCS to process electronically received items as if they were physical paper.

FIGURE 4C is a schematic block representation of ECP strip file warehouse process in a receive sub-system.

- 30 **FIGURE 5** is a schematic block representation of a first paper sorting in the receive sub-system.

FIGURE 6 is a schematic block representation of an ECP reconciliation process within the electronic check presentment system.

FIGURE 7 is a block schematic representation of a second paper pass directed fine sort operation of the receive sub-system.

FIGURE 8 is a block schematic representation of an end-of-day settlement function in the receive subsystem.

5 FIGURE 9 is a block schematic representation of a third paper pass directed fine sort operation of the receive sub-system.

Detailed Description Of The Drawings

Referring to FIGURE 1, partner banks 101 are members of an electronic check clearing house organization (ECCHO) 103. There is no limit on the number
10 of banks that may participate in the ECCHO. Typically, each partner bank in the ECCHO has a check capture system 107, such as the industry standard Check Processing Control System (CPCS) of International Business Machines Corporation, and a demand deposit accounting (DDA) system 109. Both are data processing systems having various configurations well known in the art. Additionally, when participating
15 in the ECCHO, each bank has an Electronic Check Presentment (ECP) System 105 that

is coupled to the CPCS. The ECP system may run on the same data processing equipment or computer system as the CPCS or DDA. The CPCS, DDA and ECP systems are used as follows in an electronic presentment system.

Partner banks 101A and 101B receive paper checks 111, usually deposited by
20 their respective customers. After their deposit, the checks are "captured" by the CPCS, usually after the close of business on the day they are received. The capture process begins by passing the checks through check sorting machines (not shown). The sorters read characters on each paper check that are printed with magnetic ink and are provided to a magnetic ink character recognition (MICR) system for conversion to data
25 that is stored in a CPCS mass data storage file, or MDS (not shown). The printed characters are sometimes collectively referred to as the MICR line, and the complete set of MICR-line data is sometimes called a check "image", as it contains most of the pertinent data on the check. The records in the CPCS MDS include fields for the routing/transit code for the payor bank (the bank on which the check is drawn), the
30 account number of the customer who wrote the check, the serial number of the check and its amount. Based on the routing/transit number on the check, the CPCS directs the sorter to pocket the check for the bank on which it is drawn.

At various times throughout each business day, the CPCS generates a cash letter for each bank for which there are checks. The checks that are pocketed for each bank are then bundled with the respective cash letter. Collectively the checks and the letter are simply referred to as a cash letter 113. Assuming both banks 101A and 101B have
5 checks drawn on the other bank, banks 101A and 101B deliver cash letters 113A and 113B, respectively, to the other bank via a courier 114 service that physically transports the bundle to the respective bank.

Once the cash letter has been produced, the ECP system at each bank prepares, using the same MICR-line data stored in the CPCS MDS data file, electronic cash
10 letters for each "paper" cash letter 113A and 113B that is sent. This electronic cash letter is then sent to the respective banks, using standard communication techniques over one or more electronic or optical data transmission networks 115.

Once received, the electronic cash letters are processed the same day by the receiving bank's ECP system 105 and CPCS 107. Generally, this involves having the
15 ECP systems first perform certain preprocessing functions, then presenting this electronic cash letter containing the MICR information to the CPCS. The CPCS then "captures" the items or checks in the electronic cash letter as if they were physical paper items, and sends some or all of these items to the bank's posting systems, such as Demand Deposits (DDA), and etc. This called a "non-MICR" capture, as the
20 information is not being read by the CPCS from the magnetic ink characters on the paper checks, but from a "non-MICR" file created by the ECP.

The couriers 114 usually deliver the paper cash letters 113A and 113B to the banks the next business day. Upon arrival, the paper checks are placed in the CPCS sorters at the receiving banks for capture by the CPCS system 107. After capture, the
25 ECP system reconciles the electronic and the paper cash letters with the MICR line data. The checks are then handled in the usual manner by the banks.

The forgoing is a general description of the functioning of a basic ECCHO exchange. Figures 2-8 illustrate details of the ECP system. Basically, it has two major sub-systems: 1) the Send System; and 2) the Receive System. An additional but
30 critical component of the ECP system is an on-line CIF system, that is common to both the Send and the Receive subsystems, and will be first discussed without reference to a figure. In the preferred embodiment, the ECP is implemented with a general purpose

digital computer whose operation is directed by a program such as the one disclosed in the microfiche appendix submitted herewith.

The On-Line CIF System

The On-Line CIF System handles, among other things, on-line maintenance of partner bank records, benefit sharing percentages, and edit rules. It also provides a complete data base file list and audit control reporting.

The majority of all benefits derived from the ECP process accrue to the bank receiving the electronic Cash Letter. ECCHO Rules permit each Receiving bank to negotiate benefit sharing arrangements independently with each prospective exchange partner, to provide an incentive to the partner for sending electronic Cash Letters to that bank. A key element of the system, then, is the centralized storage of each of these agreements within a single data base file.

Additional data stored in the CIF system include fields of a general nature that identify the name of the partner banks, the primary contacts at the partner banks (for both sending and receiving data) and the telephone number(s) for the primary contacts.

Data fields that are more specific are defined to include identification numbers for the partner banks, such as routing/transit numbers, version numbers of the ECCHO record formats to be sent to and received from the partner banks, send and receive cut-off times that define the target deadlines for the partner banks, send and receive volume cut-offs that identify the maximum number of items allowed for each banks transmission, and send and receive cash letter maximums that define the maximum number of cash letters allowed for transmission to and receipt from each partner bank.

The CIF system also includes fields that pertain to profit/benefit sharing for each of the partner banks. These fields store the benefit percentages to be applied to the electronic cash letters that are sent to or received from the partner banks for each day of the week. Finally, the CIF system includes fields that are used to maintain information relating to the partner bank's records such as the date and time associated with the last update of the records, as well as identification of the user responsible for the last update.

The maintenance portion of the CIF System comprises modules for adding, updating and deleting partner bank CIF records. The Add function allows an authorized user to input all partner bank data as detailed in the section discussed above.

The system contains logical edits that prevent a user from entering duplicate records (based on record type and bank-id fields). In addition, the system will not allow for sending data to, or receiving data from, partners with whom such exchanges have not been authorized in the CIF. This is determined by the ECCHO record version number.

- 5 To ease the entry of information into the Add screen, the CIF System automatically inserts the current date, time and operator id into each new record.

The Edit/Update portion of the CIF System prompts the user to enter the bank identification number for the requested record. The system then displays an edit screen, similar to the Add screen, that contains the data for the requested bank. The
10 system allows an authorized user to modify all fields within the screen except the record type, bank-id and last update fields. In addition, the Edit/Update portion of the CIF System provides the same logical edits and automatic entries that are available in the Add portion.

The Delete/Undelete portion of the CIF System allows an authorized user to
15 mark a bank record as deleted as of a specified date. The Delete/Undelete portion prompts the user to enter the bank-id number for the requested record. It then displays a screen, similar to the Add screen, containing information for the particular bank requested. The Delete/Undelete portion allows the user to close the account by entering an account closed date into the system. If, at a later time, the user wishes
20 to re-open an account, he can do so by entering zeroes in the account closed date field.

The CIF System also includes audit reporting features that detail the changes made to the CIF database, whether through Adds, Edits or Deletes. The System prompts the user to enter the start date for the report, with the end date of the report being the current system date. The CIF system scans the CIF database and selects only
25 those records that fall within the date range specified by the user. The system then formats and prints a list of all data fields along with the corresponding changes to the data fields. In addition to these features, the CIF System includes the ability to print out a detail listing of all partner bank records currently on the CIF database.

The Send System

30 Referring now briefly to FIGURES 2 and 3, the Send portion of the Electronic Check Presentment System automatically handles the selection and extraction of targeted cash letters from the CPCS system. The Send portion may be divided into

two different segments that address the diverse requirements of the marketplace: a Basic Send segment, which is Cycle and String based, shown in Figure 2; and an Enhanced Send segment, which is Cash Letter and Kill Bundle-based, shown in Figure 3.

5 Referring now to just **FIGURE 2**, the Basic Send segment provides on-line capability for initiating the creation, or re-creation, of an electronic cash letter file. The cash letter file is, in essence, a sequential file suitable for transmission to partner banks. The Basic Send segment includes an extract module 201. The cash letter extract module 201 segment allows the user to select a specific destination bank, called
10 an end point, extract all items associated with this end point, and create an electronic file of this data for conversion into a standard format. The user is first prompted to enter the specific cycle to be extracted from all cycles in the CPCS Mass Data Set 203. The extract module utilizes the bank records, discussed in the CIF System above, to dynamically build and display a screen containing all the bank names on file. The user
15 can then select a particular bank or end point for extraction. The cash letter extract

module then extracts all item records from the CPCS Mass Data Set that correspond to the selected end point and cycle requested. Upon extraction, the module builds an intermediate extract file 209 that will be used by the ECCHO format module 211. After building the intermediate file, the extract module 201 formats and prints a paper
20 detail report of all extracted items, and writes a summary record to an extract control file 207 containing the extracted end point and summary totals at the bundle level of all cash letters extracted for electronic transmission. The extract control file provides data for end of the day reporting, including an expected benefits report.

The ECCHO formatting module 211 is automatically started from the cash letter
25 extract module after the extract module builds the intermediate file. The module looks at the bank records in the CIF System to determine the proper ECCHO record version number currently in use by the specific end point bank for which the extraction was done. It then builds an electronic cash letter file, termed an ECCHO transmit file 213.

30 The electronic cash letter file in ECCHO format comprises check detail records, file, cash letter and batch headers, and file, cash letter and batch trailers. The check detail records include fields for the paying banks routing transit number, the payor's

account number, the amount of the check, the item sequence number assigned by the sending bank, and status fields that determine whether the sending bank anticipates benefit sharing, and whether the check being transmitted is for collection, return or return notice. The check detail record also includes fields for storing the depositor's
5 account number, the originating banks routing transit number, the date and time the cash letter was created, and the cash letter number.

A file header exists for each electronic cash letter file. The file header includes the ECCHO format version number for the receiving bank, the routing transit number of the presenting bank, the date and time the file was created, and the name of the
10 presenting bank. A file trailer also exists for each electronic cash letter file. This trailer includes the total dollar amount of all check records in the file, the total number of cash letters in the file, and the total dollar amount of all benefit sharing records in the file.

The electronic cash letter file also contains a cash letter header for each cash
15 letter extracted. This header includes the routing transit numbers of both the origination bank and the destination bank, the date and time the cash letter was created, the date the electronic cash letter file was created, the cash letter number, and the name of the originating bank. A cash letter trailer also exists for each cash letter in the file. This trailer includes some of the information contained in the cash letter header, as well as
20 the total dollar amount of the cash letter.

A third header in the electronic cash letter is the batch header. A batch header exists for each batch that was extracted from the CPCS Mass Data Set. The batch header includes the routing transit numbers of both the origination and destination banks, the date the batch was processed, the bundle ID, the bundle number, and the
25 cycle number. A batch trailer record is also created for each batch extracted in the electronic cash letter. The batch trailer includes the total number of all check records in the batch, the total dollar amount of all check records in the batch, and the total dollar amount of all benefit sharing check records in the batch.

In addition to the cash letter extract module, the Basic send segment of the Send
30 System also includes an extract re-run module (not shown). This module allows the user to re-create a file that has been previously extracted. Upon completing the extraction, this module compares the results of the extraction with those of the previous

extraction. If the module detects a change in the information obtained through the extraction, it will notify the user that a particular data file, or string, is missing and will identify the missing string name, bundle number, bundle amount and item count.

The Basic send segment also contains an extract re-start module that allows the user to re-start an extract job that failed due to a program or system problem. Upon execution by the user, the module creates a completely new extract file for the requested end point.

In addition to the above modules, the Basic send segment includes a number of utilities that enhance the Send System. One of the utilities, end of day reporting module 215, allows the user to request the printing of a summary level report of all electronic cash letters sent out for a specific day, along with a the corresponding expected benefits report 217. A second utility allows the user to delete an entire entry from a previous extract file.

Referring now to FIGURE 3, the Enhanced Send segment of the Send portion of the Electronic Check Presentment System extends the functionality of the Basic Send

segment to include the capability of extracting at the cash letter bundle level and ensures that the paper cash Letter and the electronic cash letter are exact duplications of one another. The enhanced send segment includes modules and files that are functionally similar to those of the basic send system: CIF file 205; CPCS Mass Data Set file 203; extract control file 207; intermediate extract file 209; ECCHO formatter 211; and ECCHO transmit file 213.

An enhanced cash letter extract module 301 allows a user to select a specific bank and a specific cash letter time, and extract all killed items for this cash letter. The extract module functions similarly to the one in the basic send segment except that, after the user has selected a bank to be extracted, the user is prompted to enter the cash letter time which will identify the kill bundles to be extracted. The module will then read the CPCS kill bundle file 303 to select records which match the requested cash letter time. The selected records provide pointers into the CPCS Mass Data Set Strings, which are used to extract all item records for the corresponding kill bundle. The module then creates an intermediate extract file 209, which is processed through the ECCHO formatter 211 module as in the basic send segment.

The enhanced send segment includes a utility that allows the user to generate an end of day benefits summary report which is a summary level report of all electronic cash letters sent out for a specific day along with the corresponding expected benefit amounts. This utility prompts the user to enter the requested cycle for the
5 report then extracts the data for the requested cycle and formats the information for printing.

The Receive System

Referring briefly to FIGURES 4A-8, a Receive System verifies, processes, and monitors the receipt of electronic cash letters from partner banks. It handles the
10 automated entry of non-MICR data into CPCS and the follow-up reconciliation of the electronically captured items to the actual physical paper items. The Receive System comprises five modules: an input file preprocessor; a CPCS non-MICR input processing module; a reconciliation module, an image match/directed fine sort module; and an end of day reporting module.

15 Referring now to FIGURE 4A, the input pre-processor module is a batch process that is either manually started, or auto-started from the transmission receive job. Its function is to balance and pre-edit an incoming ECCHO transmit or electronic cash letter file 213 from other partner banks.

The pre-processor module 401 reads the presenting banks routing transit number
20 contained in the file header record of the electronic cash letter file and validates this number against the routing transit numbers contained in the receiving banks CIF file 205. The validation determines whether the sending bank is a valid sending partner, and whether a send agreement between the two is currently in force. If the sending bank is validated in both of these respects, the pre-processor continues to process the
25 electronic cash letter file.

Upon receipt and validation of each electronic cash letter file, a record for each file is created in a receive control file 403. The record comprises data associated with the electronic cash letter file such as the name of the file, the date and time the file was created, the total number of entries in the file, and other information pertaining to file,
30 bundle and cash letter totals. This information is updated as pre-processing of the electronic cash letter file continues.

The electronic cash letter file is then checked for duplicates, at the file level, the cash letter level, and the bundle level by searching the records in the receive control file for matching creation dates and times, matching cash letter numbers and matching kill bundle identification codes and kill bundle numbers. If any duplicate
5 cash letters exist, they are bypassed during processing.

After checking for duplication, the pre-processor 401 balances the electronic cash letter file at the bundle level, the cash letter level and the file level. For balancing at the bundle level, the total number of all check records in the batch are balanced against the check record count extracted from the batch trailer. The total
10 dollar amounts of all check records and all benefit sharing check records in the batch are also balanced against the check record count extracted from the batch trailer.

The file is balanced at the cash letter level by comparing the total number of batch check records, the total dollar amount of all check records, and the total dollar amount of all benefit sharing records, that are extracted from the cash letter trailer with
15 those amounts calculated by the pre-processor upon examination of the individual check images.

The pre-processor balances the electronic cash letter file at the file level by comparing the total dollar amount of all cash letters and the total number of cash letters in the file with the associated information contained in the file trailer. The
20 pre-processor then prints a balancing report that lists, by cash letter, all out of balance batches, cash letters and/or files.

The pre-processor will then reformat the incoming file into a CPCS MICR format file termed a "MICR" file 405 to differentiate from a MICR file that is created from capturing of paper checks. This non-MICR file includes fields that specify cycle
25 codes, post/no-post codes and pocket codes. It then prints a block building report that assists the data prep/block building clerk in assembling the physical paper batches in the proper order for subsequent capture of the paper items.

Referring now to FIGURE 4, after pre-processing, the non-MICR input file 405 provided to the CPCS for a process termed paper-less MICR capture. To perform this
30 process, a preexisting CPCS system is modified so that it is "tricked" into thinking that the items presented by electronic cash letter are paper items. The CPCS captures

and processes electronic cash letters as if they were normal paper cash letters, and all captured electronic items are assigned a second item sequence number by the CPCS.

Illustrated are standard CPCS modules 407, each of which having processes well known in the art. Very briefly, the DKNMICR modules 409 includes all of the modules for interfacing with sorters for MICR capture and sorting. The OLRR SCI module 411 "edits" or checks the MICR line data for each item provided by the DKNMICR modules for validity (e.g. the routing/transit number and account number). Module 413 formats the MICR data for the item and assigns the item a pocket code for DDA or other posting system processing. This MICR data and the pocket code are written to an "all-items" I-String Information file 417, which is a mass data storage (MDS) file, in step 415. At merge step 419, the I-String Information file is converted to an M-String data file 421, by, in essence, stripping all control documents from the file. The CPCS extract module 423 then extracts the data necessary for posting to DDA or other posting systems.

For working with the ECP system, only the DKNMICR module 409 of the CPCS is substantially modified. One modification allows a Station Control Block to be defined for an electronic cash letter sorter. The function indicates that an electronic cash letter sorter has been defined so that the CPCS system can generate the necessary control blocks for the electronic cash letter. Another modification adds references to the electronic cash letter extensions for the station control block and the MICR control table. The CPCS program is also modified to look for a run started on an electronic cash letter sorter. Upon detection, it passes control to the new electronic cash letter initialization module that loads the OLRR edits and retrieves a tracer number from the receive control file 417. When the electronic cash letter sorter run has been initialized, MICR task processing continues as if processing a normal paper run.

Receive control file 417 is updated with balance summaries of the items processed from the electronic cash letter during the run by the DKNMICR modules 409 for cash letter balance control.

Upon completion of the non-MICR processing run, an ECP strip file 425 is created by an ECP strip file processing module 427. This module creates a flat file of the non-MICR input items in I-string sequence and DIIMAGE format. The strip file

creation module also creates a balance summary of the items entered in the ECP strip file 425 for error checking against the summary in receive control file 417.

Referring now to FIGURE 4C, on the next day (day 2), the ECP strip file must be updated with information about whether there were items excepted in the DDA the night before and not posted, as well as the proper cycle information for each item that was posted. To create an updated ECP strip file 429, a pocket update module 431 in the ECP system matches each item in the ECP strip file 425 with corresponding DDA cycle for the item in DDA cycle file 433 and with any exceptions for the item in DDA exceptions file 435.

Referring now to FIGURE 5, after the paper cash letter is received, it is sorted in a conventional manner, without modification, by the CPCS of the partner bank in what is termed the first paper sort. Paper items 501, the checks, are unbundled and fed throughout the MICR capture and sort system 503. The capture of the paper cash letter produces a an MDS I-String file 505, which is then merged at step 507 into an MDS M-string file 509 that will be used as an input into a reconciliation sort module.

Captured items 511 are gathered, as they will be used in a second paper pass (see Figure 7). Items rejected 513 is the MICR capture are reentered manually into the I-String file 505. All captured paper items are assigned a third item sequence number by the CPCS.

Referring now to FIGURE 6, after the first paper pass, the paper items are reconciled with the electronic items received the previous day by electronically matching the two data files in the sort/match module 601. The sort/match module sorts through the ECP strip file 429 in order to match ECP strip file with the MDS M-String file 509 and merge the pocket codes from the strip file into the M-string file to produce a MDS D-String file 605. It then produces a full report 602 in account number and item sequence number sequence, and additionally produces a missing item/free item report 603. A missing/free report 603 details any missing paper items for which there was an electronic item, and any extra paper items for which there is not a corresponding electronic item.

Referring now to FIGURE 7, the paper items 501 are once again passed through the CPCS system for pocketing the paper items. A directed fine sort module 701 matches the image of the electronic item in the D-String file 605 with the actual

paper item as it is re-read by the electronic sorter, and directs the paper item to the appropriate pocket as dictated by the pocket code in the D-String file 605, and is further described below. The directed fine sort module assumes that a pocket code is present for each item in the electronic cash letter D-string. Thus, only paper items for
5 which the corresponding electronic cash letter images have completed DDA processing are able to be directed to a pocket by the directed fine sort; all other unmatched items are considered free, or extra items and are directed to an unmatched pocket. Additionally, to facilitate matching of the paper items to the electronic items, the D-String file 605 is utilized, since these records are in the same physical sequence as the
10 actual paper items from the first paper pass.

The updated D-string file (containing the new pocket codes) directs the fine sort module, which in turn directs the sorter (not shown), to place matched paper items 703 to a pocket. The matched posted items are pocketed by statement cycle, the matched exception items are pocketed by exception code, the physical rejected items are sent
15 to a reject pocket, and the unmatched (free) items are sent to an unmatched pocket. All rejected items 705 are fully reprocessed until only the actual unmatched items remain. These items are then batched and re-captured on the electronic sorter along with all of the bank's other first time capture work. The matched items are transferred to bulk file vaults or exception processing as appropriate.

20 The directed fine sort module expects that the D-String file 605 be in the same physical sequence as the paper items after the first paper pass. If the paper items are accidentally dropped, or otherwise become out of sequence between the first and the directed fine sort/second paper pass, an optional third paper pass is then provided to read the paper items in their current order, to re-order the D-String file 605 to match
25 the new paper sequence, and then perform the directed fine sort.

Referring now to **FIGURE 8**, an end-of-day settlement module 801 reads the ECP receive control file 417 and produces an end of day or week or month settlement report 803 by bank, for all electronic cash letters received and processed through the electronic check presentment system. Additionally, an item sequence cross reference
30 report is produced, listing the three item sequence numbers associated with each item: the Sending Bank ISN, the Electronic ISN, and the paper ISN. Optionally, an item

sequence cross reference file can also be produced, for interface to various other look-up and retrieval systems.

The above described system has shown to provide an improved electronic check presentment system that allows all banks that utilize this system to electronically
5 transfer and receive check information, reconcile this information against actual paper check processes, and manage information associated with electronic check presentment such as cash letter, bundle and file totals, unmatched records/paper and benefit sharing amounts.

The above described arrangement is merely illustrative of the principles of the
10 present invention. Numerous modifications and adaptations thereof will be readily apparent to those skilled in the art without departing from the spirit and scope of the present invention as set forth in the appended claims.

What is claimed is:

1. A check presentment system for use by a bank within an organization of banks to improve clearing of checks presented between partner banks within the organization, the system comprising:

means for capturing check information from paper checks collected by a
5 presenting bank and storing the information in a first data base;

customer information file means for maintaining records identifying partner banks participating in an electronic check clearing organization and parameters relating to electronic check clearing;

data processing means responsive to the customer information file means, the
10 data processing means extracting from the first data base check information for check items to be presented to a selected partner bank and forming an electronic cash letter data file means, including check information and summary balances;

electronic means for transmitting the electronic cash letter to a partner bank for presentment of check items by means of the check information in the electronic cash
15 letter.

2. The check presentment system of Claim 1 further comprising:

electronic means for receiving an electronic cash letter transmitted from a partner bank;

data preprocessing means responsive to the customer information file means for
5 validating the partner bank, the data preprocessing means further balancing the electronic cash letter and formatting the electronic cash letter for providing check information to the means for capturing check information; and

data processing means for reconciling check information received from the partner bank in the electronic cash letter against check information received in a paper
10 cash letter sent by the partner bank that corresponds to the electronic cash letter.

3. The check presentment system of Claim 2 further comprising data processing means for controlling and maintaining records related to the transfer and receipt of the electronic cash letters.

4. The check presentment system of Claim 1 wherein the data processing means generates expected benefit reporting.

5. A check presentment system for use by a bank within an organization of banks to improve clearing of checks presented between partner banks within the organization while utilizing preexisting check processing systems, the system comprising:

5 a check processing and capture system (CPCS), the CPCS including:

means for magnetic ink character recognition (MICR) for capturing check information from paper checks deposited by customers and received from a partner bank;

10 data processing means for processing check information, the CPCS being modified to receive electronic check information; and

mass data storage file means in which the captured check information is stored;

data processing means for electronic check presentment, the data processing means including:

15 file means for maintaining records on partner banks, the records including data identifying partner banks and parameters for electronic check presentment;

send module means for extracting from the CPCS mass data storage file check information for transmission to a partner bank using identifying parameters from the file means, the send module formatting extracted check information according to a predefined format to form an electronic cash letter; and

20 receive module means for preprocessing an electronic cash letter received from a presenting bank in order to provide for validation and balancing of the electronic cash letter, the receive module means providing the check information in the electronic cash letter to the CPCS for processing; and

25 electronic communication means, coupled to the data processing means, for sending to and receiving from partner banks electronic cash letters.

6. The check presentment system of Claim 5 wherein the send module means further provides for generating expected benefits report.

7. The check presentment system of Claim 5 wherein the receive module means further reconciles an electronic cash letter received from a presenting bank with a corresponding paper cash letter received from the presenting bank.

8. The check presentment system of Claim 5 wherein the receive module means further generates an item sequence number cross reference file for cross referencing a first item sequence number assigned to each electronic check item when an electronic cash letter is captured by the CPCS with a second item sequence number
5 assigned to a corresponding paper check item during subsequent capturing of the paper cash letter.

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9. An electronic check presentment system for managing, sending and receiving check information in the form of cash letters to and from banking systems, the system comprising:

means for selecting check information for extraction from a designated database
5 containing said check information wherein the selection criteria comprises a specific bank or end point and a cash letter time;

means responsive to said selecting means for extracting said selected check information in the form of electronic cash letters;

means for transmitting and receiving said electronic cash letters to and from
10 other computer databases handling such check information;

means for reconciling the transmitted electronic cash letters against captured paper cash letters, wherein the reconciliation is accomplished by comparing the electronic cash letters against captured paper cash letters to determine discrepancies, and reporting any discrepancies to the electronic check presentment system; and

15 means for controlling and maintaining records related to the transfer and receipt
of said electronic cash letters, such information comprising the names, addresses, phone numbers and routing transit numbers of the banks utilizing the electronic check presentment system, information relating to benefit percentages that are to be shared by said utilizing banks, and dates and times related to specific transfers of electronic
20 cash letters.

10. The electronic check presentment system of Claim 9 further comprising:

means for reporting summary information related to the transfer of electronic cash letters, such information comprising the number of checks contained in specific bundles, the total dollar amounts associated with specific cash letters and bundles, the
5 total dollar amounts associated with the transfer of electronic cash letters to and from specific end points, and the dates and times associated with the transfers of specific electronic cash letters.

11. A method for managing, sending and receiving check information in the form of electronic cash letters to and from banking systems, the method comprising the steps of:

capturing paper cash letters in electronic cash letter form and storing them in a computer database;

selecting specific banks or endpoints that are to receive electronic cash letters; extracting from said database those cash letters associated with said selected

5 banks;

transmitting to said selected banks the extracted cash letters;

receiving electronic cash letters from transmitting banks and storing them in a computer database; and

reconciling said electronic cash letters against captured paper cash letters.

12. The method for managing, sending and receiving check information in the form of electronic cash letters of Claim 11 wherein the selected banks or endpoints are provided by an on-line computer database that provides information on banks utilizing this method such as the names, addresses, phone numbers, routing transit numbers and

5 contacts associated with selected banks.

13. The method for managing, sending and receiving check information in the form of electronic cash letters of Claim 11 including the additional step of reformatting the extracted cash letters into a standard format prior to transmission to the selected banks.

14. The method for managing, sending and receiving check information in the form of electronic cash letters of Claim 11 wherein the step of reconciling the electronic cash letters against captured paper cash letters is accomplished by comparing the electronic cash letters against captured paper cash letters to determine

5 discrepancies, and reporting said discrepancies to a computer system responsible for said reconciliation.

15. A method for use by a bank in a organization of banks to reduce the time for payment on checks collected by it and presented to a bank within the organization for payment, the method comprising the steps of:

- maintaining an information file for partner banks in an organization of banks;
- 5 capturing check information from paper checks collected at the bank and storing the check information in a first data base as check records;
- selecting an end point bank from the information file;
- extracting from the first data base check records for the selected bank;
- formatting the extracted check records into an electronic cash letter for
- 10 transmission to the selected bank.

16. The method of Claim 15 wherein the step of maintaining an information file on partner banks includes maintaining data identifying the banks and benefit sharing parameters.

17. The method of Claim 16 wherein the step of maintaining an information file further includes the step of maintaining data on communications parameters.

18. The method of Claim 15 wherein the step of selecting includes the step of building from the information file end-points from which to select killed bundles for extraction.

19. The method of Claim 15 wherein the step of selecting includes the step of selecting from the information file a bank; and wherein the step of extracting further includes reading from a second database storing kill bundle information with which to extract check records from the first database for transmission to endpoints automatically

5 selected from the information file.

20. The method of Claim 15 wherein the step of formatting includes formatting the records according to a predetermined format.

21. The method of Claim 20 wherein the step of formatting further includes the step of determining which check records are available for benefit sharing.

22. The method of Claim 15 further including the step of generating a settlement report, including expected benefit sharing.

23. A method of processing an electronic cash letter received from a bank for expedited clearing of checks, the method comprising the steps of:

receiving an electronic cash letter file from a sending bank containing check records;

5 preprocessing the electronic cash letter file, the step of preprocessing including the steps of validating the electronic cash letter, checking for duplicate check items, balancing dollar amounts, and formatting for conforming to check processing and capture system (CPCS);

capturing the electronic check records with a CPCS;

10 ~~posting the check records to a demand deposit accounting system;~~

capturing check information from paper checks in a subsequently received paper cash letter corresponding to the electronic cash letter; and

reconciling the check records in the electronic cash letter with the captured check information and sorting the paper checks according to DDA cycles assigned
15 during the capturing of the electronic check records.

24. The method of Claim 23 further comprising the steps of:

assigning item sequence numbers during the capturing of the electronic check records and the capturing of the paper checks; and

creating a cross reference file of the item sequence numbers for each check
5 item.

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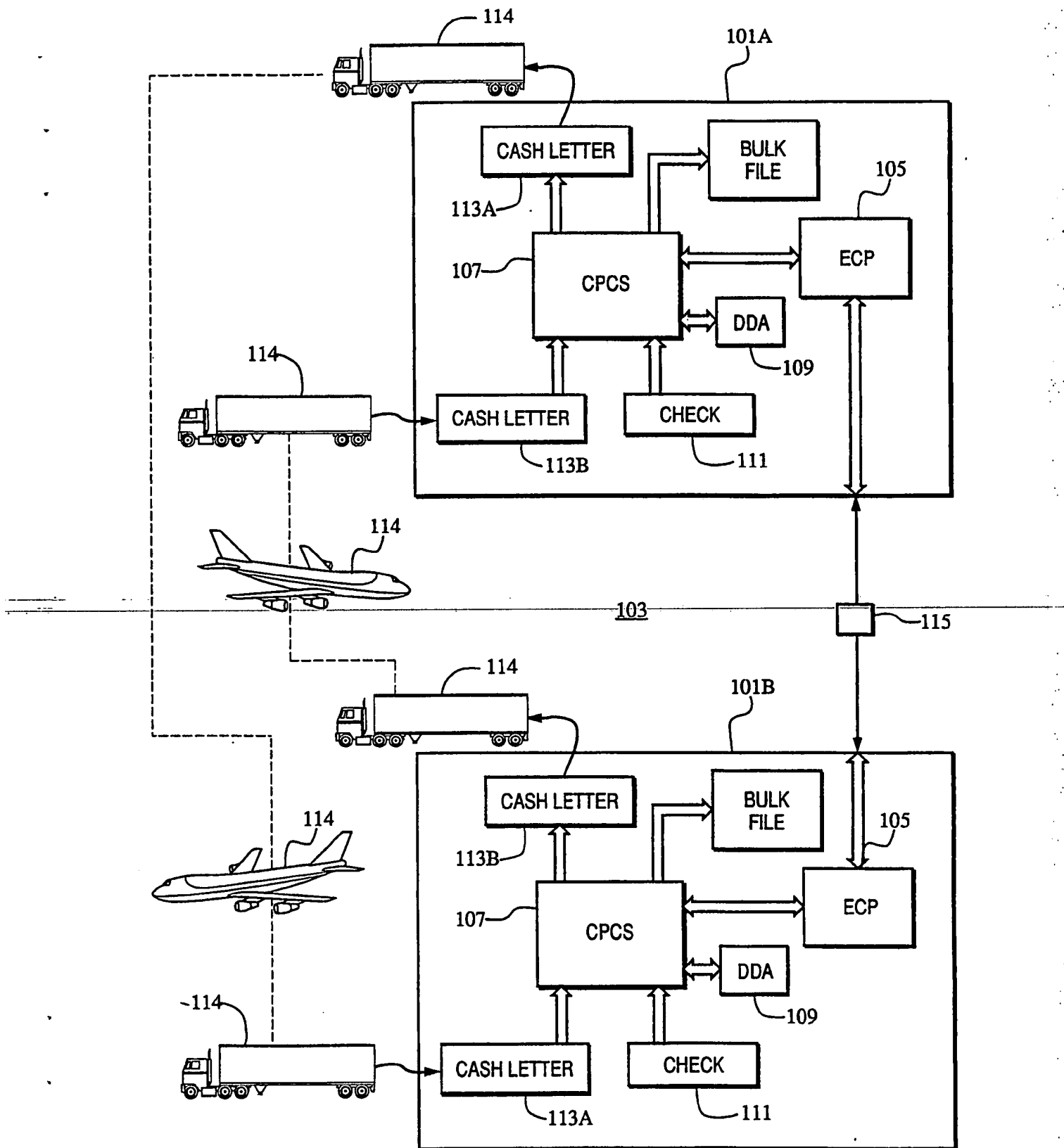


Fig.1

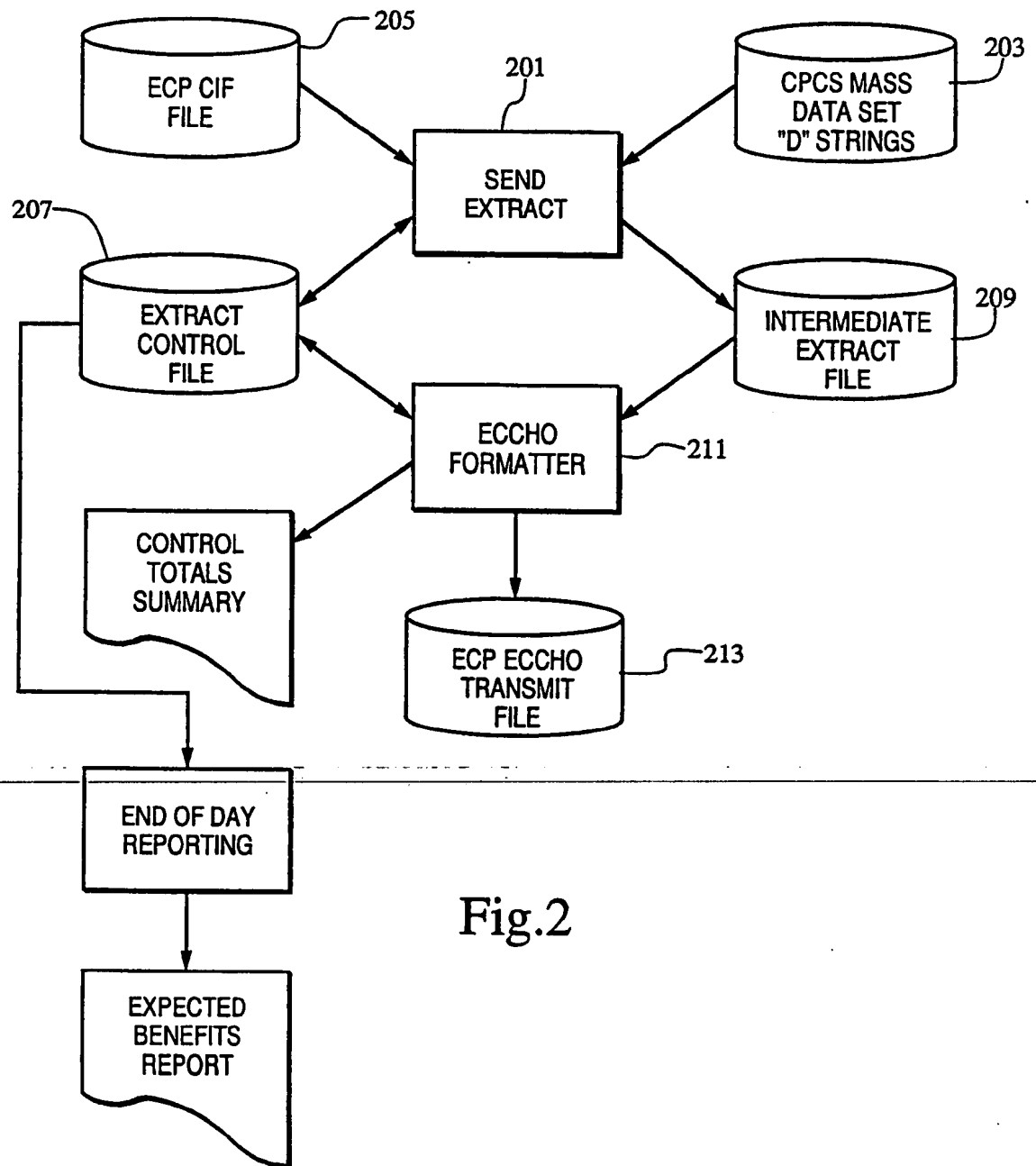


Fig.2

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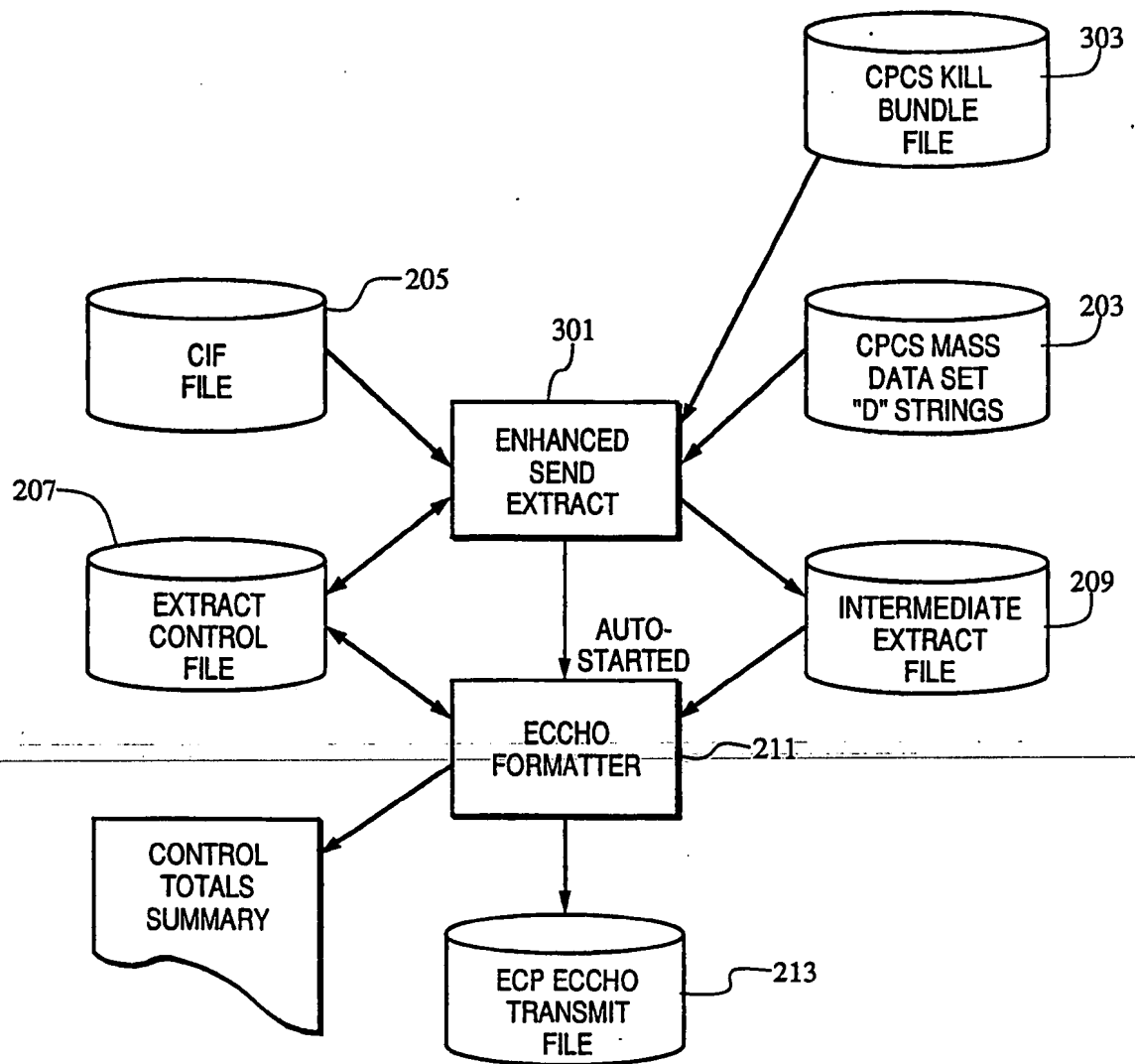


Fig.3

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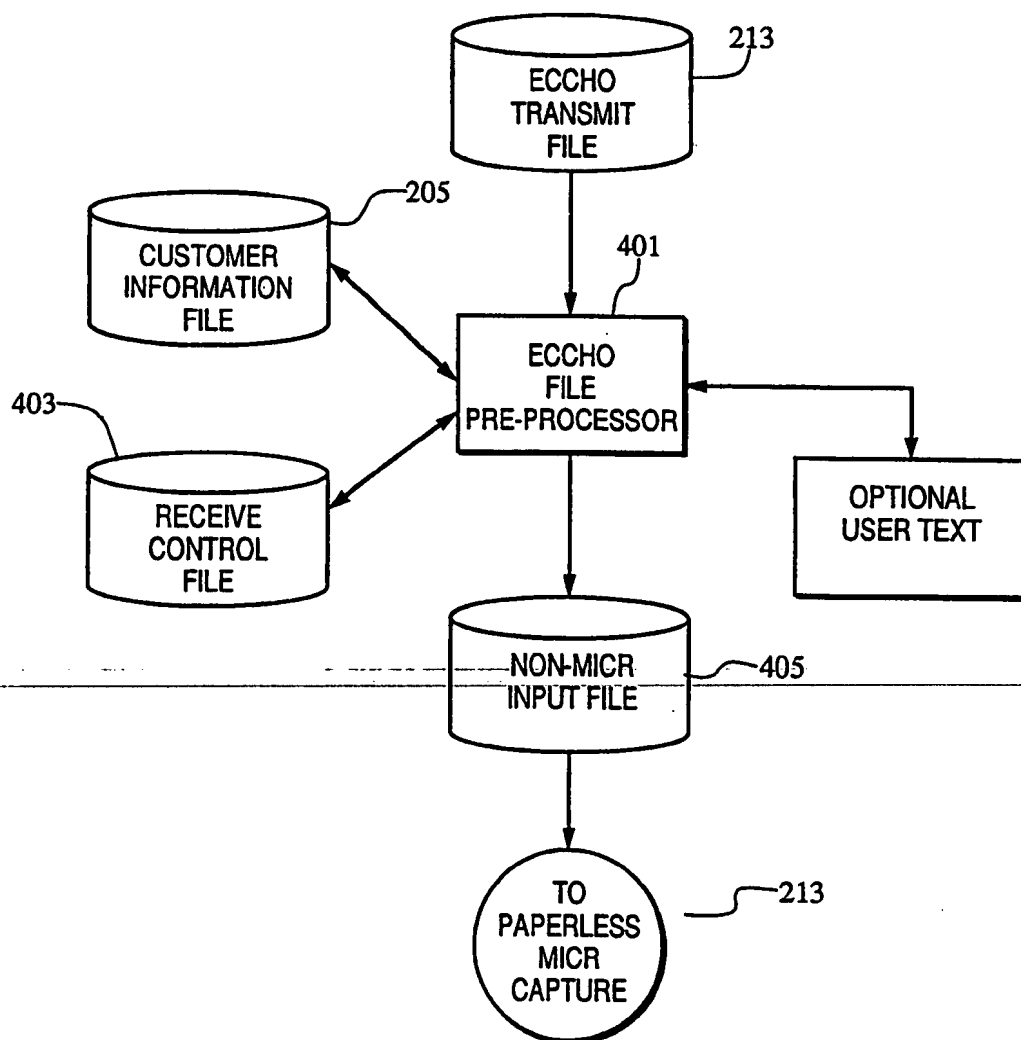


Fig.4A

5/10

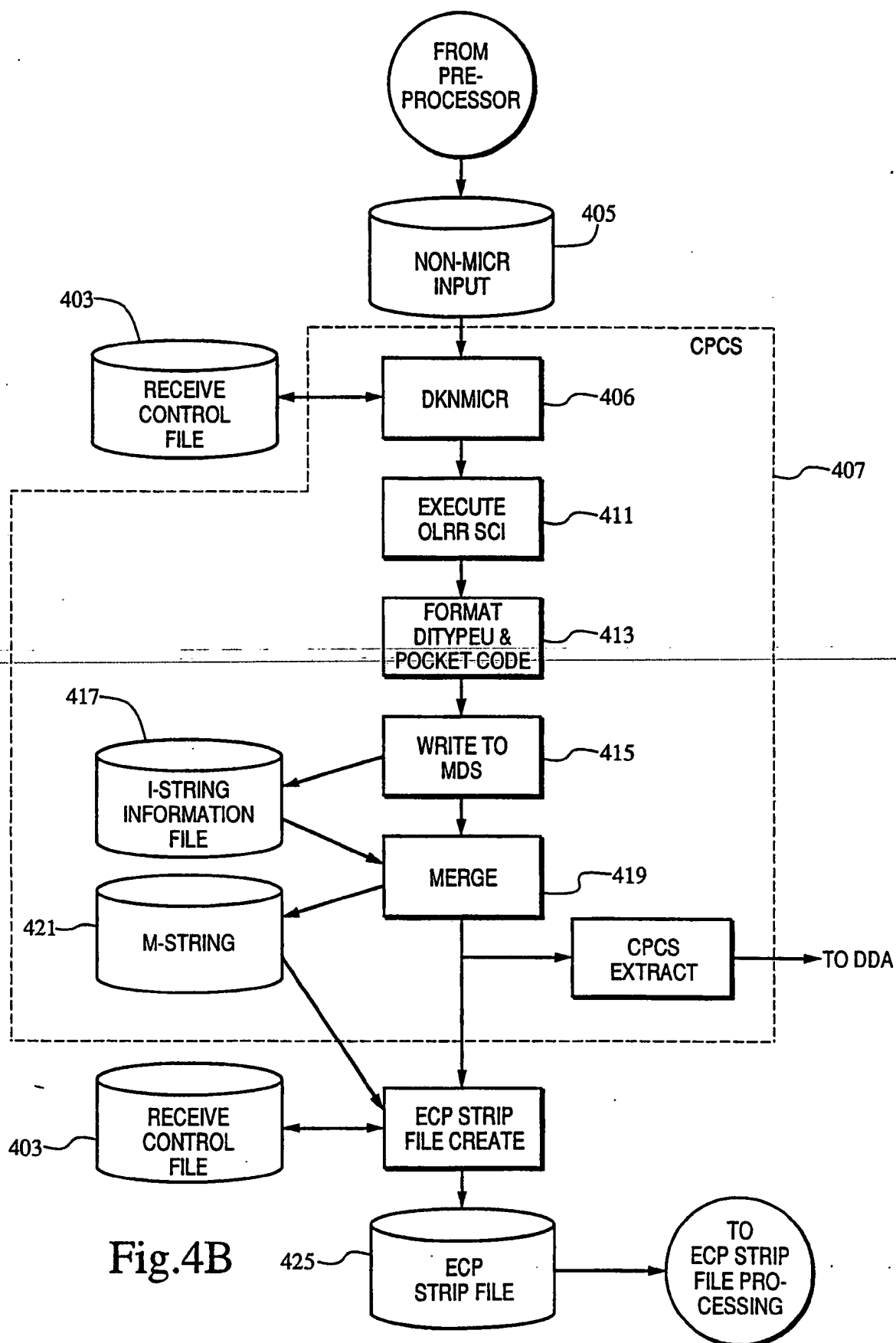


Fig.4B

4/10

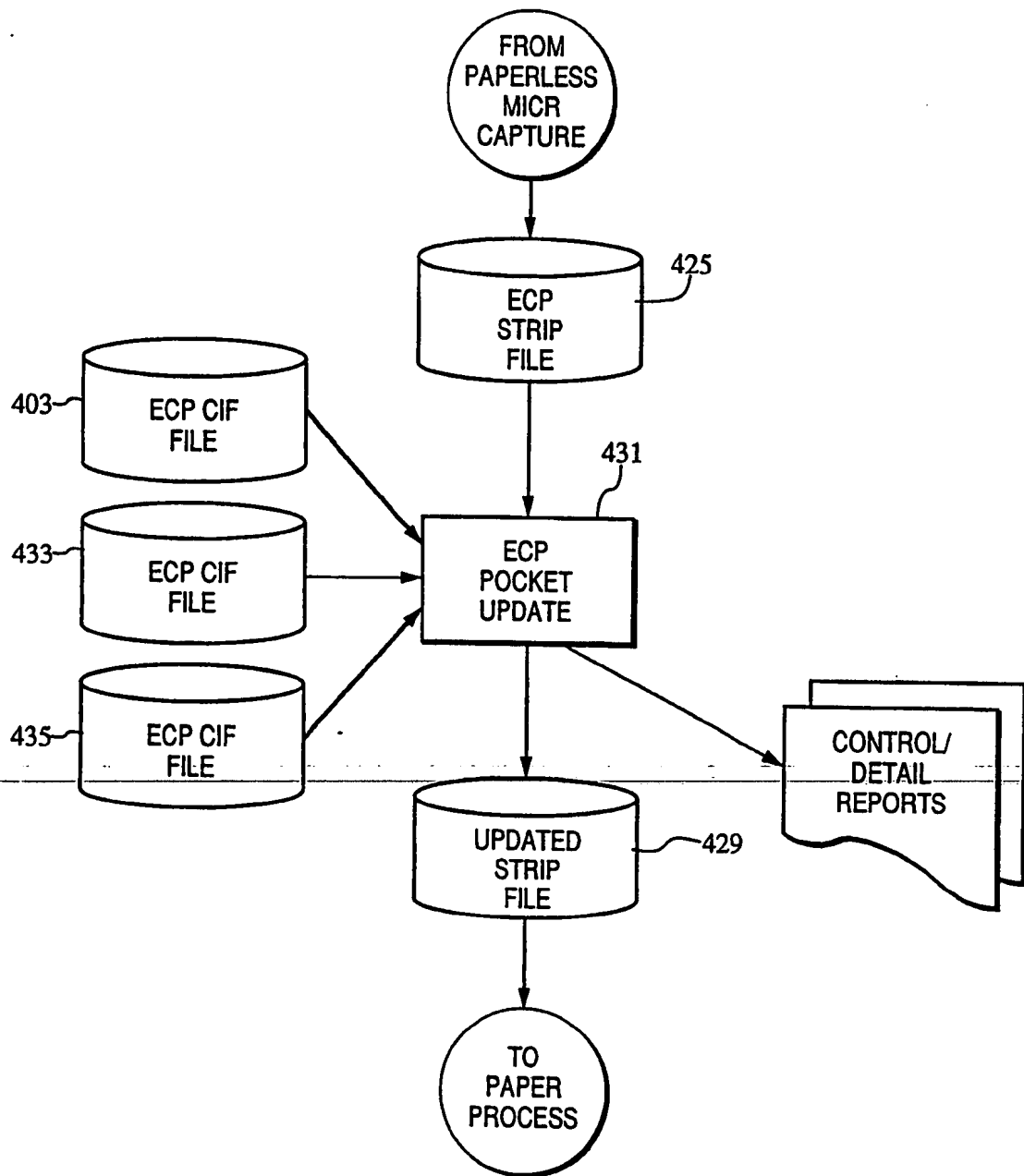


Fig.4C

7/10

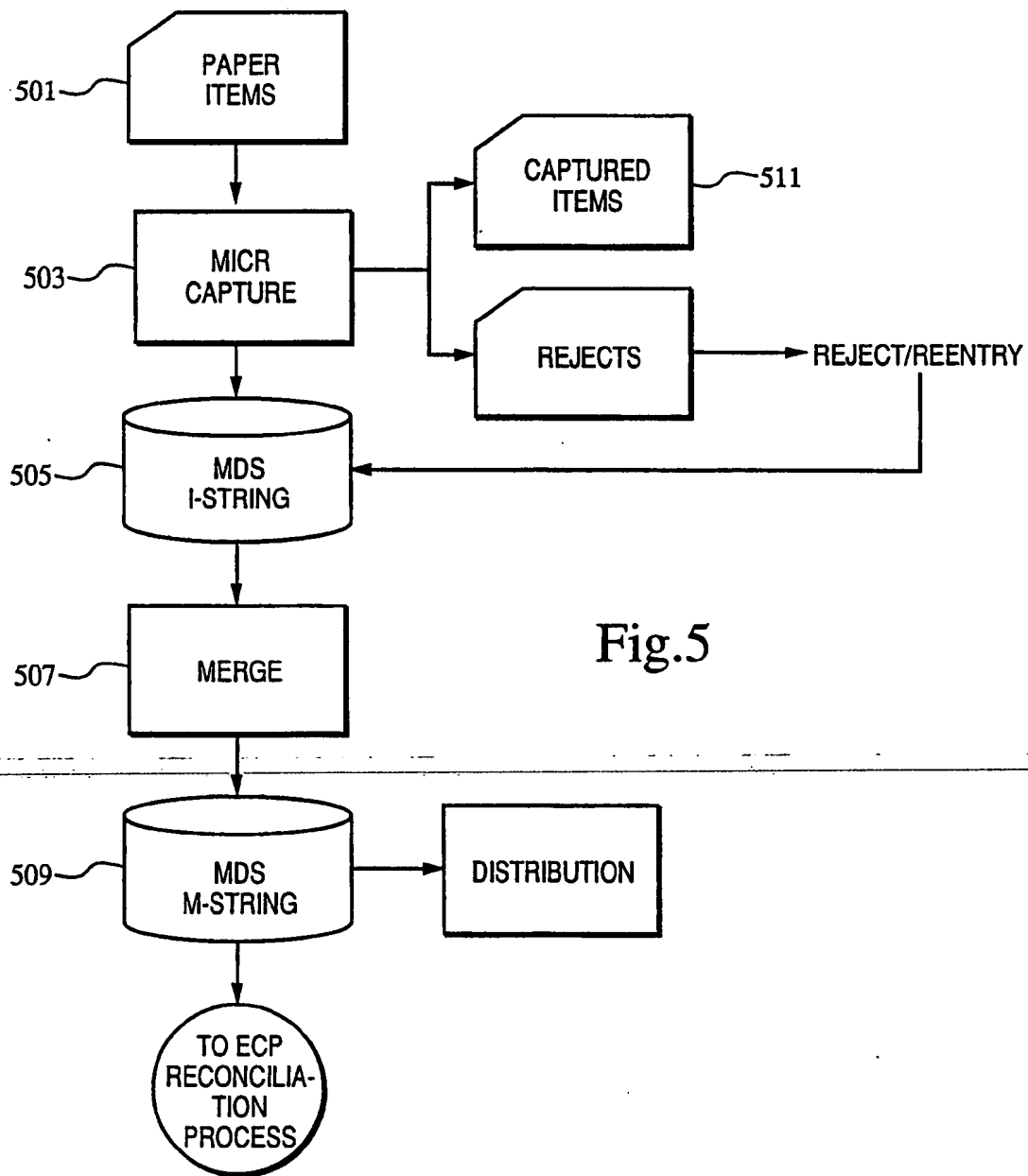


Fig.5

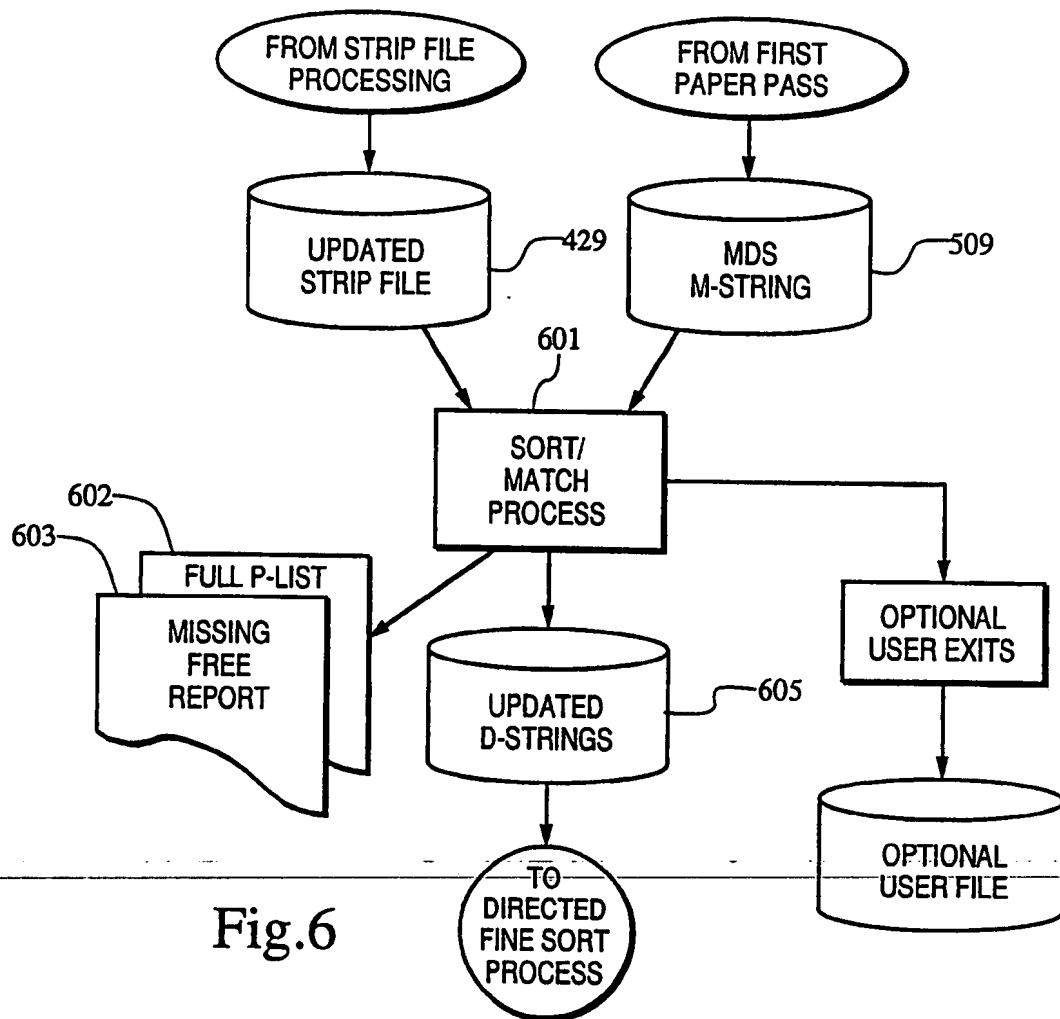


Fig.6

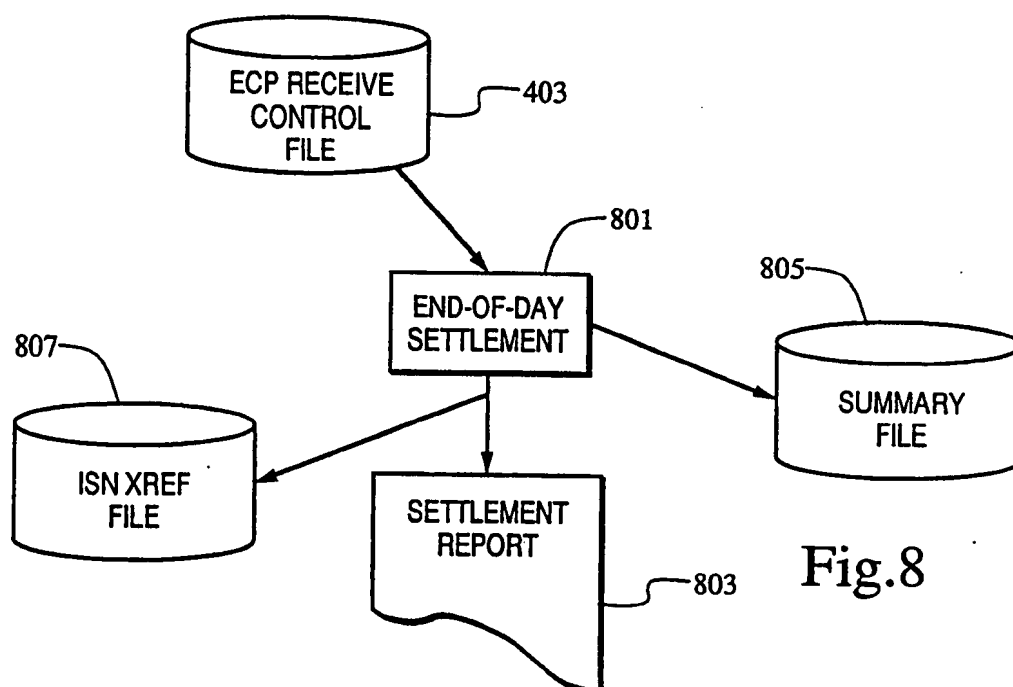


Fig.8

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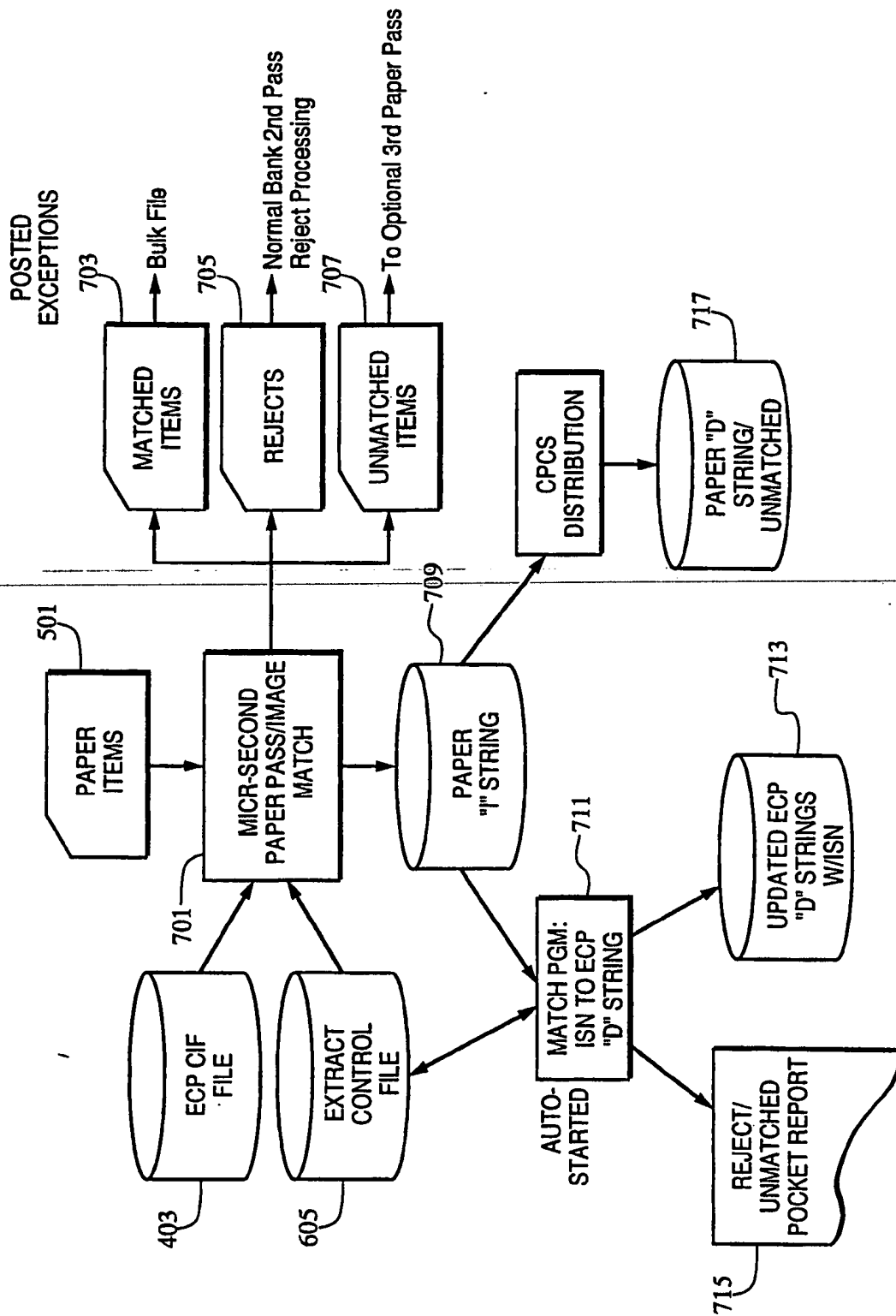


Fig.7

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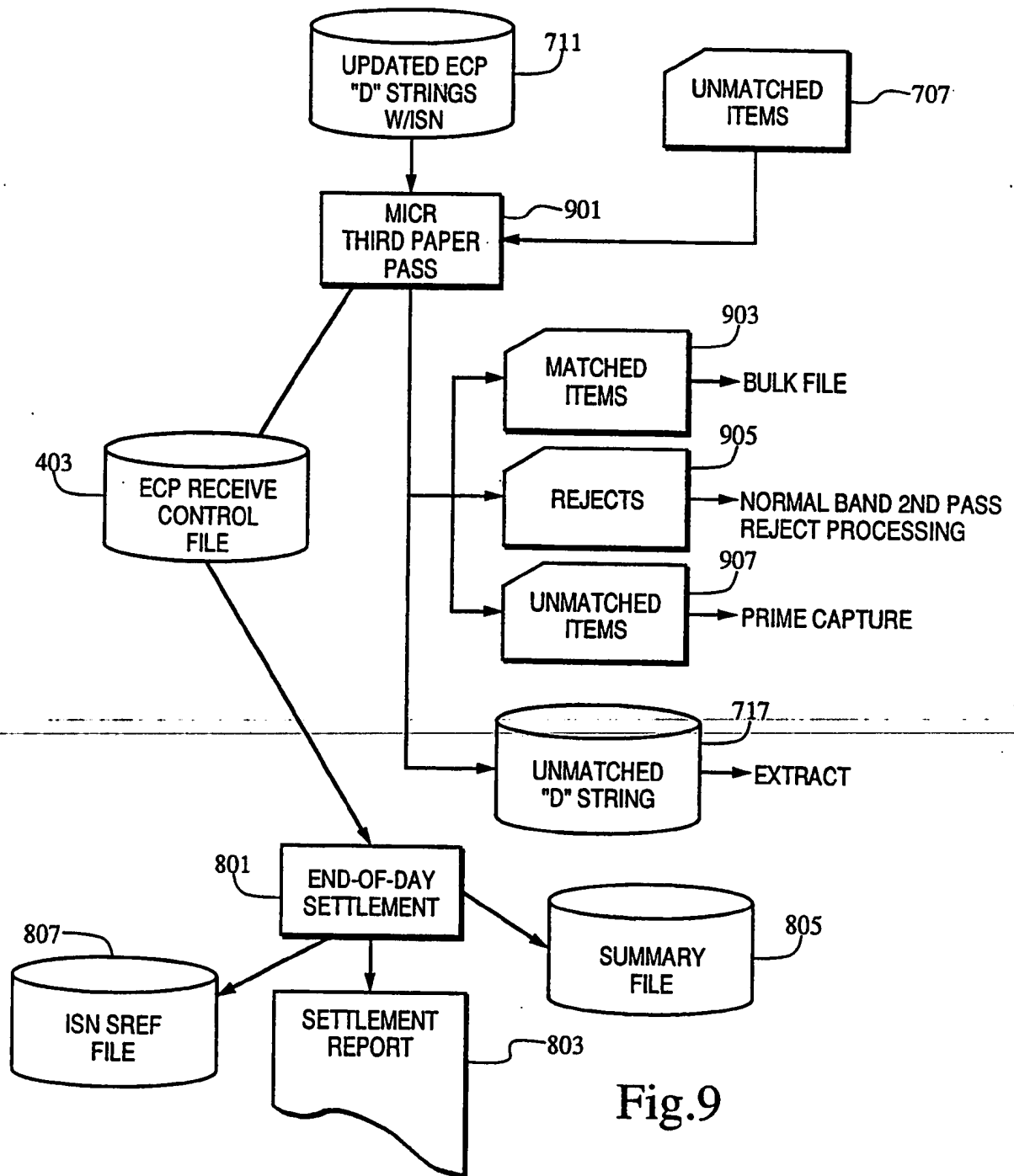


Fig.9

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US92/05780

A. CLASSIFICATION OF SUBJECT MATTER

IPC(5) :G06F 15/30

US CL :235/379; 364/401,408

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 235/379; 364/401,408

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US, A, 4,264,808 (OWENS ET AL.) 28 April 1981.	
A	US, A, 4,523,330 (CAIN) 11 June 1985.	
A	US, A, 5,038,283 (CAVENEY) 06 August 1991.	
A	JP, A, 164,368 (TORITANI) 08 October 1982.	
X Y	Unisys 19 August 1992, V Series Item Processing System Tape Input/Output Module, pages 2 center column, line 10-15.	1-3,5,7,11, 13-15,18-20 8

☐ Further documents are listed in the continuation of Box C.
 ☐ See patent family annex.

* Special categories of cited documents:	*T	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
A document defining the general state of the art which is not considered to be part of particular relevance	*X*	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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O document referring to an oral disclosure, use, exhibition or other means		
P document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search

18 AUGUST 1992

Date of mailing of the international search report

30 SEP 1992

 Name and mailing address of the ISA/
 Commissioner of Patents and Trademarks
 Box PCT
 Washington, D.C. 20231

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Division de la
recherche

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Datum/Date

10 MAY 2007

Zeichen/Ref./R.I. 8677	Anmeldung Nr./Application No./Demande n°/Patent No./Brevet n°. 02758537.1
Anmelder/Applicant/Demandeur/Patentinhaber/Proprietor/Titulaire NCR INTERNATIONAL INC.	

COMMUNICATION

The European Patent Office herewith transmits

- ☐ the European search report
- ☐ the declaration under Rule 45 EPC
- ☐ the partial European search report under Rule 45 EPC
- ☒ the European search report under Rule 112 EPC
relating to the above-mentioned European patent application. Copies of the documents cited in the search report are enclosed.

The following specifications given by the applicant have been approved by the Search Division :

- ☐ Abstract
- ☐ Title
- ☐ Figure
- ☐ The abstract was modified by the Search Division and the definitive text is attached to this communication.
- ☐ The following figure will be published with the abstract, since the Search Division considers that it better characterises the invention than the one indicated by the applicant.
Figure:
☐ Additional copy(copies) of the documents cited in the European search report.

REFUND OF THE SEARCH FEE

If applicable under Article 10 Rules relating to fees, a separate communication from the Receiving Section on the refund of the search fee will be sent later.



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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
	On request of the applicant the present search report has been drawn up for claims 11-16 relating to an electronic bundle file, a method of creating such a file, and a program storage medium embodying one or more programs of instructions executable by a computer to perform said method. -----		INV. G06F17/60 G07F19/00
X	AMERICAN BANKERS ASSOCIATION: "AMERICAN NATIONAL STANDARD ANSI X9.37 - SPECIFICATIONS FOR ELECTRONIC CHECK EXCHANGE - ABA" AMERICAN NATIONAL STANDARD FOR FINANCIAL SERVICES, XX, XX, 6 April 2001 (2001-04-06), page 1, XP008074624 Clause 4 : pages 2-21 Clause 7 : pages 24-26 Clause 8 : pages 27-30 Clause 9 : pages 31-33 Clause 10 : pages 34-37 Clause 11 : pages 38-40 -----	11-16	
A	WO 93/02424 A (CARREKER J D & ASS [US]) 4 February 1993 (1993-02-04) * page 4, line 20 - line 28 * * page 6, line 8 - page 7, line 26 * * page 9, line 30 - page 11, line 28 * -----	11-16	
A	US 5 678 046 A (CAHILL THOMAS [US] ET AL) 14 October 1997 (1997-10-14) * column 5, line 11 - line 24 * * column 9, line 5 - line 36 * * column 12, line 49 - column 16, line 35 * * * column 22, line 49 - column 28, line 39 * * ----- -/--	11-16	
Place of search		Date of completion of the search	Examiner
The Hague		19 April 2007	VAN DER HAEGEN, D
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

1
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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	AMERICAN BANKERS ASSOCIATION: "AMERICAN NATIONAL STANDARD ANSI X9.46 - AMERICAN NATIONAL STANDARD FOR FINANCIAL IMAGE INTERCHANGE: ARCHITECTURE, OVERVIEW AND SYSTEM DESIGN SPECIFICATION" AMERICAN NATIONAL STANDARD FOR FINANCIAL IMAGE INTERCHANGE: ARCHITECTURE, OVERVIEW AND SYSTEM DESIGN SPECIFICATION, XX, XX, 21 January 1997 (1997-01-21), page 1, XP008074623 * paragraph [04.1] - paragraph [4.1.2] * * paragraph [4.1.6] * * paragraph [4.2.3] - paragraph [4.2.3.2] * * paragraph [4.2.4.2] * * paragraph [5.1.1] - paragraph [5.1.5] * * paragraph [06.2] - paragraph [6.2.1.2] * * paragraph [6.2.2.2] - paragraph [6.2.2.3] * * paragraph [06.4] - paragraph [6.4.2.8.21] * Annexes A and E-H -----		TECHNICAL FIELDS SEARCHED (IPC)
Place of search		Date of completion of the search	Examiner
The Hague		19 April 2007	VAN DER HAEGEN, D
<div>CATEGORY OF CITED DOCUMENTS</div> <div><div>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</div><div>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</div></div>			

1
EPO FORM 1503 03.82 (P04C64)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 02 75 8537

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

19-04-2007

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
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ANS X9.37-2001

**American National Standard
for Financial Services**

Specifications For Electronic Check Exchange

Secretariat

American Bankers Association

Approved: April 6, 2001

American National Standards Institute

American National Standard

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American Bankers Association

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Foreword (This foreword is not part of American National Standard X9.37-2001.)

The purpose of this standard is to provide the financial industry with a format necessary to perform electronic check exchange (ECE). The format supports forward presentment, posting, return notification, and return requests, as well as existing customer information reporting products. The standard also supports multiple check clearing alternatives, e.g., bank-to-bank, bank-to-switch.

The standard was designed to accommodate and work with existing data formats used to transmit check-related data, and to provide flexibility in accommodating future developments in check processing and check product offerings. The next phase of this standard, currently under development, will address adjustments and requests for information.

Initially conceived as a necessary step in preparation for enactment of the Federal Reserve Board's Same-day Settlement proposal, it quickly became evident that the standard would benefit the financial industry in other ways. When fully implemented, the standard will enable financial institutions to cut processing costs and fraud losses by reducing the number of times a paper item must be handled, and by shortening the forward presentment and return cycle time frames.

The standard was developed for the Accredited Standards Committee on Financial Services, X9, by the Subcommittee for Electronic Wholesale Payment Related & EDI Financial Services Standards, X9E.

There are four annexes in this standard. Annexes A and B are normative and are considered part of this standard; annexes C and D are informative and are not considered part of this standard. Users of the standard are warned against using sections of the standard, especially the record layouts, out of context. Sections 1.0 through 6.8, and the normative annexes, provide information essential to the successful use of the record layouts and to the successful implementation of the standard itself.

Suggestions for improvement of this standard will be welcome. They should be sent to the X9 Committee Secretariat, American Bankers Association, 1120 Connecticut Avenue, NW., Washington, DC 20036.

This standard was processed and approved for submission to ANSI by the Accredited Standards Committee on Financial Services, X9. Committee approval of this standard does not necessarily imply that all committee members voted for its approval. At the time it approved this standard, the X9 committee had the following members:

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IVI Checkmate	Harry Grow
IVI Checkmate	Stan Spence
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Relyco Sales Inc.....	Bill Chandler
Reynolds & Reynolds.....	Mel Stephenson
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Under ASC X9 procedures, a working group may be established to address specific segments of work under the ASC X9 Committee or one of its subcommittees. A working group exists only to develop standard(s) or guideline(s) in a specific area and is then disbanded. The individual experts are listed with their affiliated organizations. However, this does not imply that the organization has approved the content of the standard or guideline. (Note: Company names of non-member participants listed only if release form was signed.)

Working Group X9E2 on Electronic Check Exchange, Returns, and Adjustments, which developed this standard, had the following participants:

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American National Standard for Financial Services —

Specifications For Electronic Check Exchange

1 Scope, purpose, and application

1.1 Scope

This standard establishes the file sequences, record types, and field formats to be used for the electronic exchange of check MICR line and associated check processing data.

This standard does not address operational, implementation, or settlement issues. These issues may include, but are not limited to: choice of compression (e.g., Blank compression), encryption (e.g., DES, Clipper), transmission specifications (e.g., protocols, line spreads), and data representation (e.g., ASCII, EBCDIC). The informative annexes attached to this standard provide information which may prove useful to those planning on implementing the standard.

1.2 Presentment disclaimer

"Presentment" is used throughout this standard in a colloquial sense only: to refer to or to describe an operational process, the movement of checks and check-related data from a collecting bank to a paying bank.

In no instance shall use of the term "presentment" in the standard be construed as a legal definition of presentment, or as a description of when presentment as a legal event occurs. Nor does its use in any way define the legal rights and responsibilities of parties participating in the check clearing process, or parties otherwise interested in a check.

This standard shall not be used by parties in dispute to define legal standards of conduct in the check clearing process, and cannot be relied upon in that context. Parties interested in the legal standards governing the check clearing process should consult the Uniform Commercial Code, Regulation CC - Availability of Funds and Collection of Checks, Federal Reserve Operating Circulars, Clearinghouse rules, other clearing agreements, relevant case law, and other sources of applicable law.

1.3 Purpose and application

The purpose of this standard is to provide a structure to facilitate electronic exchange of check data for the purposes of forward check presentment, return item notification (whether forward presentment occurred via electronic exchange or via traditional physical means), and return of truncated items.

2 References

ANSI X3.23 (1985) American National Standard for Information Systems - Programming Language - COBOL

ANSI X9.13 (1999) Specifications for Placement and Location of MICR Printing

ISO 3166-1981 Codes for the representation of names of countries

X9-TG-2 (R1995) Understanding and Designing Checks

12CFR229 Regulation CC - Availability of Funds and Collection of Checks

3 General definitions

3.1 account number: The number used by a bank to identify a customer's account. It is usually contained in the On Us Field of the MICR line.

3.2 adjustment: An accounting entry to correct errors on cash letters or checks.

3.3 all electric check: a generic term designating a negotiable instrument that has only existed in an electronic form.

3.4 amount field: Positions 1-12 of the MICR line on a document, where the dollar amount is encoded.

3.5 auxiliary on us field: A variable format, optional field in the MICR line, located to the left of the Routing field, used at the discretion of the On-Us financial institution.

3.6 bank of first deposit (BFD): The first institution, legally chartered or licensed to collect or pay checks deposited by a company or individual, in which a check has been deposited. It is also the institution to which a check would be returned in the event of non-payment, for return to the depositor. Also referred to as the depository bank.

3.7 box: A physical package used for storing and transporting checks. A typical box holds about

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3000 checks. The box total also may serve as an additional control total on the cash letter listing.

3.8 bundle: A subset of a cash letter usually containing about 300-400 checks. The dollar amount of the bundle serves as a control total and is listed on the cash letter.

3.9 cash letter: A group of checks sent by a bank or its agents to another bank, a clearing house, or a Federal Reserve office. A cash letter contains a number of negotiable items, usually checks, accompanied by a transmittal letter that lists the dollar totals of the check bundles.

3.10 electronic check exchange (ECE): The exchange of check information electronically, in lieu of or in addition to the exchange of paper checks. For forward presentment, usually referred to as electronic check presentment (ECP).

3.11 ECE Institution: The institution that creates and sends the electronic cash letter information.

3.12 external processing code (EPC) field: An optional, single digit field located to the left of the routing field on a check. The EPC field is used for special purposes as authorized by the Accredited Standards Committee X9B.

3.13 fixed format: A term applied to the required and optional fields for which the location, digit sequence and structure are completely specified.

3.14 magnetic ink character recognition (MICR): The common machine language specified for the paper-based payment transfer system. It consists of magnetic ink printed characters of a special design, called the E13B font, that can be recognized by high speed magnetic recognition equipment.

3.15 On Us field: The MICR print band area between the closing amount symbol and the opening routing symbol. Arrangement of the on us field is variable, specified by the bank on which the check is written. It may include such information as the user's account number, a consecutive number, or processing code.

3.16 payor: The party issuing a check. The payor also is known as the maker or writer.

3.17 payor bank: The institution by or through which a check is payable. The payor bank is also referred to as paying bank.

3.18 presentment: The operational process of moving checks and check related data from a collecting bank to a paying bank.

3.19 qualified return check (QRC): A return check prepared for automated processing. It is stripped or placed in a carrier envelope and encoded with the routing number of the depository bank, the dollar amount of the check, and the value '2' in position 44 of the MICR line.

3.20 Regulation CC (12 CFR part 229): The regulation adopted by the Board of Governors of the Federal Reserve System to implement the Expedited Funds Availability Act (12 U.S.C. 4001-4010). The regulation specifies, among other things, minimum availability standards for deposited funds and rules designed to expedite check collections and returns.

3.21 return item: A check returned unpaid by the payor bank. It may be returned to the BFD directly or through an intermediary.

3.22 routing field: Positions 33 through 43 of the MICR line that contains the routing number.

3.23 routing number: The nine digit numeric identified of a financial institution as assigned by the American Bankers Association or its agent. Routing numbers are used for routing purposes on checks, and virtually all other MICR documents, such as deposit tickets and batch tickets. A specific numeric series is reserved for internal bank usage.

3.24 same day settlement: A set of amendments to Regulation CC (12 CFR part 229) which specifies conditions under which a payor bank must settle for a check with a presenting bank in same-day funds.

3.25 short name: The abbreviated name assigned to a bank, typically by the Federal Reserve.

3.26 transaction code: An optional code usually located in the On-Us field that can identify document type or handling. Usage is specified by the financial institution on which the check is written.

3.27 truncation: Procedures in which the physical check is retained or delayed by the depository or collecting bank.

4 File structure

The use of record types in the standard allows a file to be structured in a manner closely matching a physical cash letter. This section describes: a) the different types of records which are mandatory and conditional within a file; b) the organization of a file; and c) representative examples of how files are structured.

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4.1 Record types

The following are record types established for ECE:

- File Header Record (Type 01)
- Cash Letter Header Record (Type 10)
- Bundle Header Record (Type 20)
- Check Detail Record (Type 25)
- Check Detail Addendum A Record (Type 26)
- Check Detail Addendum B Record (Type 27)
- Return Record (Type 31)
- Return Addendum A Record (Type 32)
- Return Addendum B Record (Type 33)
- Return Addendum C Record (Type 34)
- Bundle Control Record (Type 70)
- Box Summary Record (Type 75)
- Routing Number Summary Record (Type 85)
- Cash Letter Control Record (Type 90)
- File Control Record (Type 99)

4.2 File structure requirements

In general, an ECE file contains one or more cash letters. Cash letters contain one or more bundles which are destined for the institutions identified in the Cash Letter Header Records as the final destinations. Bundles within cash letters contain the check detail records or return records. Within a particular cash letter, check detail records and return records cannot be commingled.

As the various records are defined, reference to certain fields in various records are made. The data elements and definitions for each record type are described in sections 7 through 21.

4.2.1 File Header Record

- a) The File Header Record shall always appear as the first record in a file.

4.2.2 Cash Letter Header Record

- a) The Cash Letter Header Record shall be present and always follows a File Header Record, or a Cash Letter Control Record when a file contains multiple cash letters.
- b) A Cash Letter Header Record contains an indicator, called the Collection Type Indicator,

which identifies the type of records present within the cash letter.

4.2.3 Bundle Header Record

- a) The Bundle Header Record shall be present and always follows a Cash Letter Header Record, a Bundle Control Record, or a Box Summary Record.
- b) A Bundle Header Record contains an indicator, called the Collection Type Indicator, which identifies the type of records present within the bundle. The Collection Type Indicator in a Bundle Header Record shall be set to the same value as the Collection Type Indicator in the Cash Letter Header Record within which the bundle is contained.

4.2.4 Check Detail Record

- a) The Check Detail Record shall always follow a Bundle Header Record, a Check Detail Record, or a Check Detail Addendum Record.
- b) It shall be present only when the Collection Type Indicator is set to "forward presentment" or "forward presentment - same-day settlement" in a Bundle Header Record.
- c) There shall be one record for each check.

4.2.5 Check Detail Addendum A Record

- a) The Check Detail Addendum A Record, when used, shall always follow its immediately corresponding Check Detail Record.
- b) Only one Check Detail Addendum A Record is permitted for a Check Detail Record, when the Check Detail Record Addendum Count is set to one or two in the Check Detail Record immediately preceding the Check Detail Addendum A Record.

4.2.6 Check Detail Addendum B Record

- a) The Check Detail Addendum B Record, when used, shall always follow its immediately corresponding Check Detail Record when the Check Detail Addendum Count is set to one on the Check Detail Record immediately preceding the Check Detail Addendum B Record and a Check Detail Addendum A Record is not used.
- b) When the Check Detail Addendum Count is set to two in the Check Detail Record, the Check Detail Addendum B Record shall always follow its immediately corresponding Check Detail Addendum A Record.

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4.2.7 Return Record

- a) The Return Record shall always follow a Bundle Header Record, a Return Record, a Return Addendum A Record, a Return Addendum B Record, or a Return Addendum C Record.
- b) It shall be present only when the Collection Type Indicator is 'preliminary return information', 'return notification', or 'return request for truncated items' in a Bundle Header Record.
- c) There shall be one record for each return.

4.2.8 Return Addendum A Record

- a) The Return Addendum A Record, when used, shall always follow its immediately corresponding Return Record.
- b) No more than one Return Addendum A Record may be present for a corresponding Return Record when the Return Addendum count is set to one, two, or three in the Return Record immediately preceding the Return Addendum A Record.

4.2.9 Return Addendum B Record

- a) The Return Addendum B Record, when used, shall always follow its immediately corresponding Return Record when the Return Addendum Count is set to one in the Return Record immediately preceding the Return Addendum B Record and a Return Addendum A Record and a Return Addendum C Record are not used.
- b) When the Return Addendum Count is set to two in the Return Record, the Return Addendum B Record shall always follow its immediately corresponding Return Addendum A Record or shall be followed by a Return Addendum C Record.

4.2.10 Return Addendum C Record

- a) The Return Addendum C Record, when used, shall always follow its immediately corresponding Return Record when the Return Addendum Count is set to one in the Return Record immediately preceding the Return Addendum C Record and a Return Addendum A Record and Return Addendum B Record are not used.
- b) When the Return Addendum Count is set to two in the Return Record, the Return Addendum C Record shall always follow its immediately corresponding Return Addendum A Record and

a Return Addendum B Record is not used or the Return Addendum C Record shall always follow its immediately corresponding Return Addendum B Record and a Return Addendum A Record is not used.

- c) When the Return Addendum Count is set to three in the Return Record, the Return Addendum C Record shall always follow its immediately corresponding Return Addendum A Record and Return Addendum B Record.

4.2.11 Bundle Control Record

- a) The Bundle Control Record shall be present as the last record of the bundle, completing the bundle begun by the preceding Bundle Header Record.
- b) It shall follow a Check Detail Record, a Check Detail Addendum Record, a Return Record, a Return Addendum A Record, or a Return Addendum B Record, or a Return Addendum C Record.

4.2.12 Box Summary Record

- a) The Box Summary Record, when used, shall always follow a Bundle Control Record.

4.2.13 Routing Number Summary Record

- a) The Routing Number Summary Record, when used, shall always follow: i) the final Bundle Control Record of the cash letter; ii) a Box Summary Record, when used, of the final Bundle Control Record of the cash letter; or iii) another Routing Number Summary Record.
- b) It shall be present only when the Collection Type Indicator is 'forward presentment' or 'forward presentment - same-day settlement' in the Cash Letter Header Record.

4.2.14 Cash Letter Control Record

- a) The Cash Letter Control Record shall be present as the last record in a cash letter, completing the cash letter begun by the preceding Cash Letter Header Record.
- b) When the Empty Cash Letter Indicator in the preceding Cash Letter Header Record is blank or set to 'N', the Cash Letter Control Record shall always follow: i) the final Bundle Control Record of the cash letter; ii) a Box Summary Record, when used, of the final Bundle Control Record; or iii) the final Routing Number Summary Record, when used, of the cash letter.
- c) When the Empty Cash Letter Indicator in the preceding Cash Letter Header Record is set to

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'Y', the Cash Letter Control Record shall always follow the Cash Letter Header Record.

4.2.15 File Control Record

- a) The File Control Record shall be present as the last record of the file completing the file begun by the preceding File Header Record.

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4.3 Examples

The following are examples of ECE file structures which meet the requirements of the standard. The examples shown are representative samples of file structures and are not the only structures permitted.

4.3.1 Example 1

File with one forward presentment cash letter.

FILE HEADER RECORD**Cash Letter Header Record**

Bundle Header Record (first bundle of cash letter)

Check Detail Record (first item of first bundle)

Check Detail Record (second item of first bundle)

||

||

||

Check Detail Record (last item of first bundle)

Bundle Control Record (end of first bundle of cash letter)

Bundle Header Record (second bundle of cash letter)

Check Detail Record (first item of second bundle)

Check Detail Record (second item of second bundle)

||

||

||

Check Detail Record (last item of second bundle)

Bundle Control Record (end of second bundle of cash letter)

||

||

||

Bundle Header Record (last bundle of cash letter)

Check Detail Record (first item of last bundle)

Check Detail Record (second item of last bundle)

||

||

||

Check Detail Record (last item of last bundle)

Bundle Control Record (end of last bundle of cash letter)

Cash Letter Control Record**FILE CONTROL RECORD**

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4.3.2 Example 2

File with multiple forward presentment cash letters.

FILE HEADER RECORD**Cash Letter Header Record** (first cash letter of file)**Bundle Header Record** (first bundle of cash letter)**Check Detail Record** (first item of first bundle)**Check Detail Record** (second item of first bundle)

||

||

||

Check Detail Record (last item of first bundle)**Bundle Control Record** (end of first bundle of cash letter)**Bundle Header Record** (second bundle of cash letter)**Check Detail Record** (first item of second bundle)**Check Detail Record** (second item of second bundle)

||

||

||

Check Detail Record (last item of second bundle)**Bundle Control Record** (end of second bundle of cash letter)

||

||

||

Bundle Header Record (last bundle of cash letter)**Check Detail Record** (first item of last bundle)**Check Detail Record** (second item of last bundle)

||

||

||

Check Detail Record (last item of last bundle)**Bundle Control Record** (end of last bundle of cash letter)**Cash Letter Control Record** (end of first cash letter)**Cash Letter Header Record** (second cash letter of file)**Bundle Header Record** (first bundle of cash letter)

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Check Detail Record (first item of first bundle)
 Check Detail Record (second item of first bundle)

||
 ||
 ||

Check Detail Record (last item of first bundle)

Bundle Control Record (end of first bundle of cash letter)
 Bundle Header Record (second bundle of cash letter)

Check Detail Record (first item of second bundle)
 Check Detail Record (second item of second bundle)

||
 ||
 ||

Check Detail Record (last item of second bundle)

Bundle Control Record (end of second bundle of cash letter)

||
 ||
 ||

Bundle Header Record (last bundle of cash letter)

Check Detail Record (first item of last bundle)
 Check Detail Record (second item of last bundle)

||
 ||
 ||

Check Detail Record (last item of last bundle)

Bundle Control Record (end of last bundle of cash letter)

Cash Letter Control Record (end of second cash letter)

||
 ||
 ||

Cash Letter Header Record (last cash letter of file)

Bundle Header Record (first bundle of cash letter)

Check Detail Record (first item of first bundle)
 Check Detail Record (second item of first bundle)

||
 ||
 ||

Check Detail Record (last item of first bundle)

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Bundle Control Record (end of first bundle of cash letter)

Bundle Header Record (second bundle of cash letter)

Check Detail Record (first item of second bundle)

Check Detail Record (second item of second bundle)

||

||

||

Check Detail Record (last item of second bundle)

Bundle Control Record (end of second bundle of cash letter)

||

||

||

Bundle Header Record (last bundle of cash letter)

Check Detail Record (first item of last bundle)

Check Detail Record (second item of last bundle)

||

||

||

Check Detail Record (last item of last bundle)

Bundle Control Record (end of last bundle of cash letter)

Cash Letter Control Record (end of last cash letter)

FILE CONTROL RECORD

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4.3.3 Example 3

File with multiple forward presentment cash letters containing Check Detail Addendum A Records, Check Detail Addendum B Records, Box Summary Records, and Routing Number Summary Records.

FILE HEADER RECORD

Cash Letter Header Record (first cash letter of file)

Bundle Header Record (first bundle of cash letter)

Check Detail Record (first item of first bundle)

Check Detail Record (second item of first bundle)

Check Detail Addendum A Record (for second item of first bundle)

Check Detail Record (third item of first bundle)

Check Detail Record (fourth item of first bundle)

Check Detail Record (fifth item of first bundle)

Check Detail Addendum A Record (for fifth item of first bundle)

Check Detail Record (sixth item of first bundle)

Check Detail Addendum A Record (for sixth item of first bundle)

||

||

||

Check Detail Record (last item of first bundle)

Check Detail Addendum B Record (for last item of first bundle)

Bundle Control Record (end of first bundle of cash letter)

Bundle Header Record (second bundle of cash letter)

Check Detail Record (first item of second bundle)

Check Detail Record (second item of second bundle)

Check Detail Record (third item of second bundle)

Check Detail Record (fourth item of second bundle)

Check Detail Addendum B Record (for fourth item of second bundle)

Check Detail Record (fifth item of second bundle)

Check Detail Addendum A Record (for fifth item of second bundle)

Check Detail Addendum B Record (for fifth item of second bundle)

Check Detail Record (sixth item of second bundle)

Check Detail Addendum A Record (for sixth item of second bundle)

Check Detail Record (seventh item of second bundle)

Check Detail Record (eighth item of second bundle)

||

||

||

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Check Detail Record (last item of second bundle)
 Bundle Control Record (end of second bundle of cash letter)
 ||
 ||
 ||
 Bundle Header Record (last bundle of cash letter)
 Check Detail Record (first item of last bundle)
 Check Detail Record (second item of last bundle)
 ||
 ||
 ||
 Check Detail Record (last item of last bundle)
 Bundle Control Record (end of last bundle of cash letter)
 Routing Number Summary Record
 (for a routing number appearing in the Check Detail Records in the bundles within this cash letter)
 Routing Number Summary Record
 (for another routing number appearing in the Check Detail Records in the bundles within this cash letter)
 Routing Number Summary Record
 (for another routing number appearing in the Check Detail Records in the bundles within this cash letter)
 Cash Letter Control Record (end of first cash letter)
 Cash Letter Header Record (second cash letter of file)
 Bundle Header Record (first bundle of cash letter)
 Check Detail Record (first item of first bundle)
 Check Detail Record (second item of first bundle)
 ||
 ||
 ||
 Check Detail Record (last item of first bundle)
 Bundle Control Record (end of first bundle of cash letter)
 Bundle Header Record (second bundle of cash letter)
 Check Detail Record (first item of second bundle)
 Check Detail Record (second item of second bundle)
 ||
 ||
 ||

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Check Detail Record (last item of second bundle)

Bundle Control Record (end of second bundle of cash letter)

||
||
||

Bundle Header Record (28th bundle of cash letter)

Check Detail Record (first item of 28th bundle)

Check Detail Record (second item of 28th bundle)

||
||
||

Check Detail Record (last item of 28th bundle)

Bundle Control Record (end of 28th bundle of cash letter)

Box Summary Record (summary of first through 28th bundle of cash letter)

Bundle Header Record (29th bundle of cash letter)

Check Detail Record (first item of 29th bundle)

Check Detail Record (second item of 29th bundle)

||
||
||

Check Detail Record (last item of 29th bundle)

Bundle Control Record (end of 29th bundle of cash letter)

||
||
||

Bundle Header Record (last bundle of cash letter)

Check Detail Record (first item of last bundle)

Check Detail Record (second item of last bundle)

||
||
||

Check Detail Record (last item of last bundle)

Bundle Control Record (end of last bundle of cash letter)

Box Summary Record (summary of 29th through last bundle of cash letter)

Routing Number Summary Record

(for a routing number appearing in the Check Detail Records in the bundles within this cash letter)

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Routing Number Summary Record
 (for another routing number appearing in the Check Detail Records in the bundles within this cash letter)

Cash Letter Control Record (end of second cash letter)

||
 ||
 ||

Cash Letter Header Record (last cash letter of file)

Bundle Header Record (first bundle of cash letter)

Check Detail Record (first item of first bundle)
 Check Detail Record (second item of first bundle)

||
 ||
 ||

Check Detail Record (last item of first bundle)

Bundle Control Record (end of first bundle of cash letter)

Bundle Header Record (second bundle of cash letter)

Check Detail Record (first item of second bundle)
 Check Detail Record (second item of second bundle)

||
 ||
 ||

Check Detail Record (last item of second bundle)

Bundle Control Record (end of second bundle of cash letter)

||
 ||
 ||

Bundle Header Record (last bundle of cash letter)

Check Detail Record (first item of last bundle)
 Check Detail Record (second item of last bundle)

||
 ||
 ||

Check Detail Record (last item of last bundle)

Bundle Control Record (end of last bundle of cash letter)

Cash Letter Control Record (end of last cash letter)

FILE CONTROL RECORD

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4.3.4 Example 4

File with multiple return cash letters containing Return Addendum A Records, Return Addendum B Records, and Return Addendum C Records.

FILE HEADER RECORD

Cash Letter Header Record (first cash letter of file)

Bundle Header Record (first bundle of cash letter)

Return Record (first item of first bundle)

Return Record (second item of first bundle)

Return Addendum A Record (for second item of first bundle)

Return Addendum B Record (for second item of first bundle)

Return Addendum C Record (for second item of first bundle)

Return Record (third item of first bundle)

Return Record (fourth item of first bundle)

Return Addendum A Record (for fourth item of first bundle)

Return Addendum B Record (for fourth item of first bundle)

Return Addendum C Record (for fourth item of first bundle)

Return Record (fifth item of first bundle)

Return Addendum B Record (for fifth item of first bundle)

Return Record (sixth item of first bundle)

Return Addendum A Record (for sixth item of first bundle)

Return Addendum C Record (for sixth item of first bundle)

Return Record (seventh item of first bundle)

Return Addendum B Record (for seventh item of first bundle)

Return Record (eighth item of first bundle)

Return Addendum A Record (for eighth item of first bundle)

||

||

||

Return Record (last item of first bundle)

Return Addendum A Record (for last item of first bundle)

Bundle Control Record (end of first bundle of cash letter)

Bundle Header Record (second bundle of cash letter)

Return Record (first item of second bundle)

Return Record (second item of second bundle)

Return Record (third item of second bundle)

Return Record (fourth item of second bundle)

Return Addendum C Record (for fourth item of second bundle)

Return Record (fifth item of second bundle)

Return Addendum A Record (for fifth item of second bundle)

Return Addendum B Record (for fifth item of second bundle)

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Return Record (sixth item of second bundle)

Return Addendum B Record (for sixth item of second bundle)

Return Record (seventh item of second bundle)

Return Record (eighth item of second bundle)

||

||

||

Return Record (last item of second bundle)

Return Addendum A Record (for last item of second bundle)

Bundle Control Record (end of second bundle of cash letter)

||

||

||

Bundle Header Record (last bundle of cash letter)

Return Record (first item of last bundle)

Return Record (second item of last bundle)

||

||

||

Return Record (last item of last bundle)

Bundle Control Record (end of last bundle of cash letter)

Cash Letter Control Record (end of first cash letter)

Cash Letter Header Record (second cash letter of file)

Bundle Header Record (first bundle of cash letter)

Return Record (first item of first bundle)

Return Record (second item of first bundle)

||

||

||

Return Record (last item of first bundle)

Bundle Control Record (end of first bundle of cash letter)

Bundle Header Record (second bundle of cash letter)

Return Record (first item of second bundle)

Return Record (second item of second bundle)

||

||

||

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Return Record (last item of second bundle)

Bundle Control Record (end of second bundle of cash letter)

||
||
||

Bundle Header Record (last bundle of cash letter)

Return Record (first item of last bundle)

Return Record (second item of last bundle)

||
||
||

Return Record (last item of last bundle)

Bundle Control Record (end of last bundle of cash letter)

Cash Letter Control Record (end of second cash letter)

||
||
||

Cash Letter Header Record (last cash letter of file)

Bundle Header Record (first bundle of cash letter)

Return Record (first item of first bundle)

Return Addendum A Record (for first item of first bundle)

Return Record (second item of first bundle)

||
||
||

Return Record (last item of first bundle)

Bundle Control Record (end of first bundle of cash letter)

Bundle Header Record (second bundle of cash letter)

Return Record (first item of second bundle)

Return Record (second item of second bundle)

Return Addendum A Record (for second item of second bundle)

Return Addendum B Record (for second item of second bundle)

||
||
||

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Return Record (last item of second bundle)

Bundle Control Record (end of second bundle of cash letter)

||

||

||

Bundle Header Record (last bundle of cash letter)

Return Record (first item of last bundle)

Return Addendum A Record (for first item of last bundle)

Return Addendum B Record (for first item of last bundle)

Return Record (second item of last bundle)

||

||

||

Return Record (last item of last bundle)

Bundle Control Record (end of last bundle of cash letter)

Cash Letter Control Record (end of last cash letter)

FILE CONTROL RECORD

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4.3.5 Example 5

File with multiple forward presentment and return cash letters records. Refer to the File Structure Requirements (Section 4.2) and the previous examples for the structure of bundles.

FILE HEADER RECORD

Cash Letter Header Record (first cash letter of file)

||

{bundles of forward items}

||

Cash Letter Control Record (end of first cash letter)

Cash Letter Header Record (second cash letter of file)

||

{bundles of forward items}

||

Cash Letter Control Record (end of second cash letter)

Cash Letter Header Record (third cash letter of file)

||

{bundles of return items}

||

Cash Letter Control Record (end of third cash letter)

Cash Letter Header Record (fourth cash letter of file)

||

{bundles of forward items}

||

Cash Letter Control Record (end of fourth cash letter)

Cash Letter Header Record (fifth cash letter of file)

||

{bundles of forward items}

||

Cash Letter Control Record (end of fifth cash letter)

Cash Letter Header Record (sixth cash letter of file)

||

{bundles of return items}

||

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Cash Letter Control Record (end of sixth cash letter)||
||
||**Cash Letter Header Record (last cash letter of file)**||

||

{bundles of forward items}

Cash Letter Control Record (end of last cash letter)**FILE CONTROL RECORD**

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4.3.6 Example 6

File with multiple forward presentment cash letters which contain bundles of records and cash letters which are empty.

FILE HEADER RECORD

Cash Letter Header Record (first cash letter of file)

Bundle Header Record (first bundle of cash letter)

Check Detail Record (first item of first bundle)

Check Detail Record (second item of first bundle)

||

||

||

Check Detail Record (last item of first bundle)

Bundle Control Record (end of first bundle of cash letter)

Bundle Header Record (second bundle of cash letter)

Check Detail Record (first item of second bundle)

Check Detail Record (second item of second bundle)

||

||

||

Check Detail Record (last item of second bundle)

Bundle Control Record (end of second bundle of cash letter)

||

||

||

Bundle Header Record (last bundle of cash letter)

Check Detail Record (first item of last bundle)

Check Detail Record (second item of last bundle)

||

||

||

Check Detail Record (last item of last bundle)

Bundle Control Record (end of last bundle of cash letter)

Cash Letter Control Record (end of first cash letter)

Cash Letter Header Record (second cash letter of file)

This is an empty cash letter. Therefore, no bundles are present.

Cash Letter Control Record (end of second cash letter)

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||
||
||

Cash Letter Header Record (last cash letter of file)**Bundle Header Record** (first bundle of cash letter)**Check Detail Record** (first item of first bundle)**Check Detail Record** (second item of first bundle)

||
||
||

Check Detail Record (last item of first bundle)**Bundle Control Record** (end of first bundle of cash letter)**Bundle Header Record** (second bundle of cash letter)**Check Detail Record** (first item of second bundle)**Check Detail Record** (second item of second bundle)

||
||
||

Check Detail Record (last item of second bundle)**Bundle Control Record** (end of second bundle of cash letter)

||
||
||

Bundle Header Record (last bundle of cash letter)**Check Detail Record** (first item of last bundle)**Check Detail Record** (second item of last bundle)

||
||
||

Check Detail Record (last item of last bundle)**Bundle Control Record** (end of last bundle of cash letter)**Cash Letter Control Record** (end of last cash letter)**FILE CONTROL RECORD**

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5 Data and field specifications**5.1 Generic data types**

The following are the names, abbreviations, and definitions of the characters permitted in the standard.

5.1.1 Alphabetic (a)

The alphabetic characters are the upper case letters A through Z, the lower case letters a through z, and the blank (space) character. When lower case letters are used, they shall be interpreted to have the same meaning as their respective upper case letters, e.g., no distinction shall be made between the upper case letter A and the lower case letter a.

5.1.2 Numeric (n)

The numeric characters are the numbers zero (0) through nine (9).

5.1.3 Blank (b)

The blank character is defined in EBCDIC with the hexadecimal value '40' and in ASCII with the hexadecimal value '20'; also referred to as a space.

5.1.4 Special characters (s)

Special characters are any printable characters with an EBCDIC hexadecimal value greater than '3F' or ASCII value greater than '1F' that are neither alphabetic, nor numeric, nor blank.

5.1.5 Alphameric (an)

An alphameric character is any of the alphabetic or numeric characters.

5.1.6 Alphameric/special (ans)

An alphameric/special character is any one of the alphabetic, numeric, or special characters.

5.1.7 Numericblank (nb)

A numericblank character is any one of the numeric characters or the blank character.

5.2 Special MICR line data types

The MICR line on a check is composed of a series of symbols. The MICR symbols for numbers shall be represented by the numeric values zero (0) through nine (9). However, the MICR symbols for delineation of data on the MICR line do not have any graphic equivalents.

Therefore, certain special characters shall be used to interpret these MICR symbols. These special characters shall have these special meanings only when used in fields directly read from the MICR line.

When these same special characters are used elsewhere in other fields they shall represent their actual value.

5.2.1 Asterisk (*)

The asterisk character shall be used to represent the presence of MICR when the processing system cannot interpret the MICR as a specific valid MICR character.

5.2.2 Dash (-)

The dash character shall be used to represent the presence of the MICR symbol 'dash'.

5.2.3 Forward slash (/)

The forward slash character shall be used to represent the presence of the MICR symbol 'on us'.

5.2.4 Numericblank/special MICR (nbsm)

A numericblank/special character is any one of the numeric characters, the blank character, or asterisk character.

5.2.5 Numericblank/special MICR On us (nbsmos)

A numericblank/special MICR On us character is any one of the numeric characters, the blank character, the asterisk character, the dash character, or the slash character.

5.3 Fill data

Fill data are any characters used to fill up unused bytes in a field. Fill characters shall be Blanks or Zeros.

5.4 Data justification

Justification is the act of aligning data as it is placed into a field, based on its right or left-most character.

5.4.1 Right justification

A field is right justified when the data is aligned based on its right-most character.

5.4.2 Left justification

A field is left justified when the data is aligned based on its left-most character.

5.5 General field orientation

The following shall apply to all fields on all records in the standard, except for those detailed in section 5.6, Exception Fields.

- a) A field defined as alphameric, alphabetic, alphameric/special, or numericblank shall be left justified.

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- b) A field defined as alphameric, alphabetic, alphameric/special, or numericblank shall be blank filled.
- c) A field defined as numeric shall be right justified.
- d) A field defined as numeric shall be zero filled.
- e) A field defined as numericblank/special MICR or numericblank/special MICR On Us shall be right justified.
- f) A field defined as numericblank/special MICR or numericblank/special MICR On Us shall be blank filled.
- g) If a field is mandatory and has predefined values, it shall contain one of these predefined values or it is invalid.
- h) If a field is conditional, is used and has predefined values, it shall contain one of these predefined values or it is invalid.
- i) All fields that are conditional and are not used shall be filled with Blanks.

5.6 Exception fields

The following fields are exceptions to the above.

5.6.1 Check Detail Addendum A Record

- a) The deposit account number at BFD field shall be right justified and blank filled

5.6.2 Return Record Addendum A Record

- a) The deposit account number at BFD field shall be right justified and blank filled

5.7 User fields

Most records of the ECE file provide for user fields. Users of the standard utilize these fields at their discretion. The standard does not define particular uses for or the internal contents of these fields. In many cases, the user fields within the records are more than one character in length. Users are free to use the field as a single field or divide it into multiple fields.

6 Table headings and title descriptions

Sections 7.0 through 19.0 contain the ECE records. The table headings and the titles used in those sections are described below.

6.1 Field

This column contains sequential field numbers.

6.2 Field name

This column contains the name of the field.

6.3 Usage

This column identifies whether the field shall be mandatory or conditional:

- a) Mandatory (M) – the data element shall always be present; and
- b) Conditional (C) – the data element shall be present only under certain conditions.

6.4 Position

This column contains the starting and ending location of each field within the record.

6.5 Size

This column contains the number of characters within the field.

6.6 Type

This column identifies the kind of data that shall be valid for the field. The type indicates, in general, the allowable characters permitted, but may be restricted to a subset of the type. When a restriction exists, the allowable character or characters are defined in the section where the field is described.

6.7 Format

This title describes the unique structure for a particular field, when one exists.

6.8 Defined values

This title serves two purposes. For some fields, it provides a specific value or a list of specific values and the interpretation of each value. Second, for some fields it provides the allowable range of values.

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7 File Header Record (Type 01)

The File Header Record is mandatory and contains fourteen fields. It is the first record of an electronic check exchange file. The data in the fields are created by the institution sending the file, the immediate origin institution.

FIELD	FIELD NAME	USAGE	POSITION	SIZE	TYPE
1	Record type	M	01 - 02	2	N
2	Standard level	M	03 - 04	2	N
3	Test file indicator	M	05 - 05	1	A
4	Immediate destination routing number	M	06 - 14	9	N
5	Immediate origin routing number	M	15 - 23	9	N
6	File creation date	M	24 - 31	8	N
7	File creation time	M	32 - 35	4	N
8	Resend indicator	M	36 - 36	1	A
9	Immediate destination name	C	37 - 54	18	A
10	Immediate origin name	C	55 - 72	18	A
11	File ID modifier	C	73 - 73	1	AN
12	Country code	C	74 - 75	2	A
13	User field	C	76 - 79	4	ANS
14	Reserved	M	80 - 80	1	B

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7.1 Record type

A code that identifies the type of record.

Usage: Mandatory

Position: 01 – 02

Size: 2

Type: N Numeric

Defined

Values: '01' File Header Record

7.2 Standard level

A code that identifies the version of the standard used to create the electronic check exchange file.

Usage: Mandatory

Position: 03 – 04

Size: 2

Type: N Numeric

Defined

Values: '01' X9.37-1994

'02' X9.37-2001

7.3 Test file indicator

A code that indicates whether the file being transmitted is a test file or a production file.

Usage: Mandatory

Position: 05 – 05

Size: 1

Type: A Alphabetic

Defined

Values: 'P' Production File
'T' Test File**7.4 Immediate destination routing number**

A number that identifies the institution that receives the electronic check exchange file.

Usage: Mandatory

Position: 06 – 14

Size: 9

Type: N Numeric

Format: TTTTAAAAC, where:

TTTT Federal Reserve Routing Symbol

AAAA ABA Institution Identifier

C Check Digit

7.5 Immediate origin routing number

A number that identifies the institution that originates the electronic check exchange file.

Usage: Mandatory

Position: 15 – 23

Size: 9

Type: N Numeric

Format: TTTTAAAAC, where:

TTTT Federal Reserve Routing
Symbol

AAAA ABA Institution Identifier

C Check Digit

7.6 File creation date

The year, month, and day that the immediate origin institution creates the electronic check exchange file.

Usage: Mandatory

Position: 24 – 31

Size: 8

Type: N Numeric

Format: YYYYMMDD, where:

YYYY year

MM month

DD day

Defined

Values: YYYY '1993' through '9999'

MM '01' through '12'

DD '01' through '31'

7.7 File creation time

The time the immediate origin institution creates the electronic check exchange file.

Usage: Mandatory

Position: 32 – 35

Size: 4

Type: N Numeric

Format: hhmm, where:

hh hour

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mm minute
 Defined
 Values: hh '00' through '23'
 mm '00' through '59'

7.8 Resend Indicator

A code that indicates whether the electronic check exchange file has been previously transmitted in its entirety.

Usage: Mandatory
 Position: 36 – 36
 Size: 1
 Type: A Alphabetic
 Defined
 Values: 'Y' resend file
 'N' original file

7.9 Immediate destination name

The short name that identifies the institution that receives the electronic check exchange file.

Usage: Conditional. Shall be present, unless omitted under clearing arrangements.
 Position: 37 – 54
 Size: 18
 Type: A Alphabetic

7.10 Immediate origin name

The short name that identifies the institution that sends the electronic check exchange file.

Usage: Conditional. Shall be present, unless omitted under certain clearing arrangements.
 Position: 55 – 72
 Size: 18
 Type: A Alphabetic

7.11 File ID modifier

A code that permits multiple electronic check exchange files, created on the same date and between the same institutions, to be distinguished one from another.

Usage: Conditional. Shall be present, unless omitted under clearing arrangements.
 Position: 73 – 73
 Size: 1

Type: AN Alphabetic

Defined
 Values: 'A' through 'Z'
 'O' through '9'

7.12 Country code

A code that identifies the country in which the payor bank is located.

Usage: Conditional. Shall be present only if file consists of foreign items in US dollars.
 Position: 74 – 75
 Size: 2
 Type: A Alphabetic
 Defined
 Values: ISO specified values

7.13 User field

A field used at the discretion of users of the standard.

Usage: Conditional. Shall be present only under certain clearing arrangements.
 Position: 76 – 79
 Size: 4
 Type: ANS Alphabetic/Special

7.14 Reserved

A field reserved for future use by the Accredited Standards Committee X9.

Usage: Mandatory
 Position: 80 – 80
 Size: 1
 Type: B Blank

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8 Cash Letter Header Record (Type 10)

The Cash Letter Header Record is mandatory and contains fourteen fields. The data in the fields are created by the ECE institution, which may or may not be the bank of first deposit.

FIELD	FIELD NAME	USAGE	POSITION	SIZE	TYPE
1	Record type	M	01 - 02	2	N
2	Collection type indicator	M	03 - 04	2	N
3	Final destination routing number	M	05 - 13	9	N
4	ECE institution routing number	M	14 - 22	9	N
5	Cash letter business date	M	23 - 30	8	N
6	Cash letter creation date	M	31 - 38	8	N
7	Cash letter creation time	M	39 - 42	4	N
8	Empty cash letter indicator	M	43 - 43	1	A
9	Truncation indicator	C	44 - 44	1	A
10	Cash letter ID	C	45 - 52	8	AN
11	Originator contact name	C	53 - 66	14	ANS
12	Originator contact phone number	C	67 - 76	10	N
13	User field	C	77 - 79	3	ANS
14	Reserved	M	80 - 80	1	B

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8.1 Record type

A code that identifies the type of record.

Usage: Mandatory

Position: 01 - 02

Size: 2

Type: N Numeric

Defined

Values: '10' Cash Letter Header

8.2 Collection type indicator

A code that identifies the type of cash letter and bundle.

Usage: Mandatory

Position: 03 - 04

Size: 2

Type: N Numeric

Defined

Values: '01' Forward Presentment

'02' Forward Presentment-same-day settlement

'03' Return Request for truncated items

'04' Return Notification

'05' Preliminary Return Information

'06' Second Preliminary Return Information

8.3 Final destination routing number

A number that identifies the institution that receives and processes the cash letter or the bundle.

Usage: Mandatory

Position: 05 - 13

Size: 9

Type: N Numeric

Format: TTTTAAAAC, where:

TTTT Federal Reserve Routing Symbol

AAAA ABA Institution Identifier

C Check Digit

8.4 ECE institution routing number

A number that identifies the institution that creates the cash letter header record.

Usage: Mandatory

Position: 14 - 22

Size: 9

Type: N Numeric

Format: TTTTAAAAC, where:

TTTT Federal Reserve Routing Symbol

AAAA ABA Institution identifier

C check digit

8.5 Cash letter business date

The year, month, and day that designates the business date of the cash letter.

Usage: Mandatory

Position: 23 - 30

Size: 8

Type: N Numeric

Format: YYYYMMDD, where:

YYYY year

MM month

DD day

Defined

Values: YYYY '1993' through '9999'

MM '01' through '12'

DD '01' through '31'

8.6 Cash letter creation date

The year, month, and day that the cash letter is created.

Usage: Mandatory

Position: 31 - 38

Size: 8

Type: N Numeric

Format: YYYYMMDD, where:

YYYY year

MM month

DD day

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Defined
Values: YYYY '1993' through '9999'
MM '01' through '12'
DD '01' through '31'

8.7 Cash letter creation time

The time the cash letter is created.

Usage: Mandatory
Position: 39 – 42
Size: 4
Type: N Numeric
Format: hhmm, where:
hh hour
mm minute

Defined
Values: hh '00' through '23'
mm '00' through '59'

8.8 Empty cash letter indicator

A code which indicates whether the cash letter contains bundles of check detail records (type 25) or return records (type 31).

Usage: Mandatory.
Position: 43 – 43
Size: 1
Type: A Alphabetic
Defined
Values: 'Y' Empty Cash Letter
'N' Cash Letter contains items

8.9 Truncation Indicator

A code that indicates if all of the items contained in the cash letter are truncated, regardless of the External Processing Code(s) found on the Check Detail Records (Type 25).

Usage: Conditional. Shall be present if Collection Type Indicator value is '01' - Forward Presentment or '02' - Forward Presentment - same-day settlement, and the Empty Cash Letter Indicator is not set to 'Y'.
Position: 44 – 44
Size: 1
Type: A Alphabetic

Defined
Values: 'Y' Truncated
'N' Not Truncated

8.10 Cash letter ID

A code that identifies the cash letter, assigned by the institution that creates the cash letter.

Usage: Conditional. Shall be present, unless omitted under clearing arrangements.
Position: 45 – 52
Size: 8
Type: AN Alphameric

8.11 Originator contact name

A contact at the institution that creates the cash letter.

Usage: Conditional. Shall be present, unless omitted under clearing arrangements.
Position: 53 – 66
Size: 14
Type: ANS Alphameric/Special

8.12 Originator contact phone number

The phone number of the contact at the institution that creates the cash letter.

Usage: Conditional. Shall be present if available, unless omitted under clearing arrangements.
Position: 67 – 76
Size: 10
Type: N Numeric

8.13 User field

A field used at the discretion of users of the standard.

Usage: Conditional. Shall be present only under clearing arrangements.
Position: 77 – 79
Size: 3
Type: ANS Alphameric/Special

8.14 Reserved

A field reserved for future use by the Accredited Standards Committee X9.

Usage: Mandatory
Position: 80 – 80

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Size: 1

Type: B Blank

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9 Bundle Header Record (Type 20)

The Bundle Header Record is mandatory and contains twelve fields. The data in the fields are created by the BCE institution, which may or may not be the bank of first deposit.

FIELD	FIELD NAME	USAGE	POSITION	SIZE	TYPE
1	Record type	M	01 – 02	2	N
2	Collection type indicator	M	03 – 04	2	N
3	Final destination routing number	M	05 – 13	9	N
4	ECE institution routing number	M	14 – 22	9	N
5	Bundle business date	M	23 – 30	8	N
6	Bundle creation date	M	31 – 38	8	N
7	Bundle ID	C	39 – 48	10	AN
8	Bundle sequence number	C	49 – 52	4	NB
9	Cycle number	C	53 – 54	2	AN
10	Return location routing number	C	55 – 63	9	N
11	User field	C	64 – 65	2	ANS
12	Reserved	M	66 – 80	15	B

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9.1 Record type

A code that identifies the type of record.

Usage: Mandatory

Position: 01 - 02

Size: 2

Type: N Numeric

Defined

Values: '20' Bundle Header Record

9.2 Collection type indicator

A code that identifies the type of cash letter and bundle.

Usage: Mandatory

Position: 03 - 04

Size: 2

Type: N Numeric

Defined

Values: '01' Forward Presentment

'02' Forward Presentment—
same day settlement

'03' Return Request for truncated items

'04' Return Notification

'05' Preliminary Return Information

'06' Second Preliminary Return
Information**9.3 Final destination routing number**

A number that identifies the institution that receives and processes the cash letter or the bundle.

Usage: Mandatory

Position: 05 - 13

Size: 9

Type: N Numeric

Format: TTTTAAAAC, where:

TTTT Federal Reserve Routing
Symbol

AAAA ABA Institution Identifier

C Check Digit

9.4 ECE institution routing number

A number that identifies the institution that creates the bundle header record.

Usage: Mandatory

Position: 14 - 22

Size: 9

Type: N Numeric

Format: TTTTAAAAC, where

TTTT Federal Reserve Routing
Symbol

AAAA ABA Institution Identifier

C Check Digit

9.5 Bundle business date

The year, month, and day that designates the business date of the bundle.

Usage: Mandatory

Position: 23 - 30

Size: 8

Type: N Numeric

Format: YYYYMMDD, where:

YYYY year

MM month

DD day

Defined

Values: YYYY '1993' through '9999'

MM '01' through '12'

DD '01' through '31'

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9.6 Bundle creation date

The year, month, and day that the bundle is created.

Usage: Mandatory

Position: 31 – 38

Size: 8

Type: N Numeric

Format: YYYYMMDD, where:

YYYY year

MM month

DD day

Defined

Values: YYYY '1993' through '9999'

MM '01' through '12'

DD '01' through '31'

9.7 Bundle ID

A number that identifies the bundle, assigned by the institution that creates the bundle.

Usage: Conditional. Shall be present, unless omitted under clearing arrangements.

Position: 39 – 48

Size: 10

Type: AN Alphameric

9.8 Bundle sequence number

A number assigned by the institution that creates the bundle. Usually denotes the relative position of the bundle within the cash letter.

Usage: Conditional. Shall be present, unless omitted under clearing arrangements.

Position: 49 – 52

Size: 4

Type: NB Numericblank

9.9 Cycle number

A code assigned by the institution that creates the bundle. Denotes the cycle under which the bundle is created.

Usage: Conditional. Shall be present if available, unless omitted under clearing arrangements.

Position: 53 – 54

Size: 2

Type: AN Alphameric

9.10 Return location routing number

A number specified by the Institution that creates the bundle, indicating the location to which preliminary return information, return notifications and return requests should be sent.

Usage: Conditional. Shall be present if collection type indicator value is '01' - Forward Presentment or '02' - Forward Presentment-same day settlement, unless omitted under clearing arrangements.

Position: 55 – 63

Size: 9

Type: N Numeric

Format: TTTTAAAAC, where:

TTTT Federal Reserve Routing Symbol

AAAA ABA Institution Identifier

C check digit

9.11 User field

A field used at the discretion of users of the standard.

Usage: Conditional. Shall be present only under clearing arrangements.

Position: 64 – 65

Size: 2

Type: ANS Alphameric/Special

9.12 Reserved

A field reserved for future use by the Accredited Standards Committee X9.

Usage: Mandatory

Position: 66 – 80

Size: 15

Type: B Blank

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10 Check Detail Record (Type 25)

The Check Detail Record is conditional and contains sixteen fields. It shall be present in a bundle designated as forward presentment with a collection type indicator of '01' or '02'. One check detail record shall be sent for each check. The data in fields 2 through 7 are read from the check MICR line; the order of these fields is the order in which they appear on the check.

FIELD	FIELD NAME	USAGE	POSITION	SIZE	TYPE
1	Record type	M	01 – 02	2	N
2	Auxiliary On Us	C	03 – 17	15	NBSM
3	External processing code	C	18 – 18	1	NBSM
4	Payor bank routing number	M	19 – 26	8	N
5	Payor bank routing number check digit	C	27 – 27	1	NBSM
6	On Us	C	28 – 47	20	NBSMOS
7	Item amount	M	48 – 57	10	N
8	ECE institution item sequence number	M	58 – 72	15	NB
9	Documentation type indicator	M	73 – 73	1	NB
10	Return acceptance indicator	M	74 – 74	1	AN
11	MICR valid indicator	C	75 – 75	1	NB
12	BFD indicator	M	76 – 76	1	A
13	Check detail record addendum count	M	77 – 77	1	N
14	On Us format indicator	M	78 – 78	1	N
15	User field	C	79 – 79	1	ANS
16	Reserved	M	80 – 80	1	B

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10.1 Record type

A code that identifies the type of record.

Usage: Mandatory

Position: 01 – 02

Size: 2

Type: N Numeric

Defined

Values: '25' Check Detail Record

10.2 Auxiliary On Us

A code used on commercial checks at the discretion of the payor bank.

Usage: Conditional. Shall be present if on the MICR line.

Position: 03 – 17

Size: 15

Type: NBSM Numericblank/
special MICR**10.3 External processing code**

A code used for special purposes as authorized by the Accredited Standards Committee X9. Also known as Position 44.

Usage: Conditional. Shall be present if on the MICR line.

Position: 18 – 18

Size: 1

Type: NBSM Numericblank/
special MICR**10.4 Payor bank routing number**

A number that identifies the institution by or through which the item is payable.

Usage: Mandatory

Position: 19 – 26

Size: 8

Type: N Numeric

Format: TTTTAAA, where:

TTTT Federal Reserve Routing
Symbol

AAAA ABA Institution Identifier

10.5 Payor bank routing number check digit

A digit used with a modular check digit routine to validate the Routing Number.

Usage: Conditional. Shall be present if on the MICR line.

Position: 27 – 27

Size: 1

Type: NBSM Numericblank/Special MICR

Format: C Check Digit

10.6 On Us

Data specified by the payor bank. On Us data usually consists of the payor's account number, a serial number or transaction code, or both.

Usage: Conditional. Shall be present if truncation indicator value is 'Y'. If truncation indicator value is 'N', shall be present unless omitted under clearing arrangements.

Position: 28 – 47

Size: 20

Type: NBSMOS Numericblank/special
MICR On us**10.7 Item amount**

The US dollar value of the check.

Usage: Mandatory

Position: 48 – 57

Size: 10

Type: N Numeric

10.8 ECE Institution Item sequence number

A number assigned by the institution that creates the check detail record.

Usage: Mandatory

Position: 58 – 72

Size: 15

Type: NB Numericblank

10.9 Documentation type indicator

A code that indicates the type of documentation that supports the check detail record.

Usage: Mandatory

Position: 73 – 73

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Size: I

Type: AN Alphameric

Defined Values:

- 'A' Paper to follow
- 'B' Paper to follow; microfilm archive available
- 'C' Paper to follow; image archive available
- 'D' Paper to follow; image archive transmission available
- 'E' Paper to follow; microfilm and image archive available
- 'F' Paper to follow; microfilm and image archive available, image archive transmission available.
- 'G' Image to follow
- 'H' Image to follow; microfilm archive available
- 'I' Image to follow; image archive available
- 'J' Image to follow; image archive transmission available
- 'K' Image to follow; microfilm and image archive available
- 'L' Image to follow; microfilm and image archive available, image archive transmission available
- 'M' Paper and image to follow
- 'N' Paper and image to follow; microfilm archive available
- 'O' Paper and image to follow; image archive available
- 'P' Paper and image to follow; image archive transmission available
- 'Q' Paper and image to follow; microfilm and image archive available
- 'R' Paper and image to follow; microfilm and image archive available, image archive transmission available
- 'S' Truncation; microfilm archive available
- 'T' Truncation; image archive available
- 'U' Truncation; image archive transmission available

'V' Truncation; microfilm and image archive available

'W' Truncation; microfilm and image archive available, image archive transmission available

'X' All electronic check to follow

'Y' Truncation; all electronic check archive available

10.10 Return acceptance indicator

A code that indicates whether the institution that creates the check detail record will or will not accept electronic return information.

Usage: Mandatory

Position: 74 - 74

Size: I

Type: AN Alphameric

Defined

Values: '1' Will accept preliminary return information, return request for truncated items, and return notifications

'2' Will accept preliminary return information and return request for truncated items

'3' Will accept preliminary return information and return notifications

'4' Will accept return request for truncated items and return notifications

'5' Will accept preliminary return information only

'6' Will accept return request for truncated items only

'7' Will accept return notification only

'8' Will not accept electronic return information

'A' Will accept preliminary return information, return request for truncated items, return notifications and second preliminary return information.

'B' Will accept preliminary return information, return request for truncated items and second preliminary return information.

'C' Will accept preliminary return information, return notifications and second preliminary return information.

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'D' Will accept return request for truncated items, return notifications and second preliminary return information.

'E' Will accept preliminary return information and second preliminary return information.

'F' Will accept return request for truncated items, and second preliminary return information.

'G' Will accept return notifications and second preliminary return information.

'H' Will accept second preliminary return information only.

10.11 MICR valid indicator

A code that indicates whether any character in the Auxiliary On Us field, the External Processing Code field, the Payor Bank Routing Number field, the Payor Bank Routing Number Check Digit field, the On Us field, or the Item Amount field, is unreadable; or, the On Us field is missing from the Check Detail Record.

Usage: Conditional. Shall be present only under clearing arrangements.

Position: 75 – 75

Size: 1

Type: NB Numeric blank

Defined

Values: '1' Good read
'2' Good read, missing field
'3' Read error encountered
'4' Missing field and read error encountered

10.12 BFD Indicator

A code that indicates whether the ECE institution indicated on the bundle header record (type 20) is the bank of first deposit (BFD).

Usage: Mandatory

Position: 76 – 76

Size: 1

Type: A Alphabetic

Defined

Values: 'Y' ECE institution is BFD
'N' ECE institution is not BFD

'U' ECE institution relationship to BFD is undetermined

10.13 Check detail record addendum count

The number of check detail record addenda to follow.

Usage: Mandatory

Position: 77 – 77

Size: 1

Type: N Numeric

Defined

Values: '0' no addenda
'1' one addendum to follow
'2' two addenda to follow

10.14 On Us format indicator

A code that indicates how the On Us field is formatted.

Usage: Mandatory

Position: 78 – 78

Size: 1

Type: N Numeric

Defined

Values: '1' Standard Format
'2' Interim fixed format

10.15 User field

A field used at the discretion of users of the standard.

Usage: Conditional. Shall be present only under clearing arrangements.

Position: 79 Values: 79

Size: 1

Type: ANS Alphameric/Special

10.16 Reserved

A field reserved for future use by the Accredited Standards Committee X9.

Usage: Mandatory

Position: 80 – 80

Size: 1

Type: B Blank

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11 Check Detail Addendum A Record (Type 26)

The Check Detail Addendum A Record is conditional and contains eight fields. It shall be present unless omitted under clearing arrangements; the record is created by the ECE institution, which may or may not be the bank of first deposit. It is one of two addenda available for use with the Check Detail Record (Type 25).

FIELD	FIELD NAME	USAGE	POSITION	SIZE	TYPE
1	Record type	M	01 - 02	2	N
2	Correcting institution routing number	C	03 - 11	9	N
3	Bank of First Deposit (BFD) routing number	C	12 - 20	9	NB
4	BFD business (endorsement) date	C	21 - 28	8	N
5	BFD item sequence number	C	29 - 43	15	NB
6	Deposit account number at BFD	C	44 - 61	18	ANS
7	BFD deposit branch	C	62 - 66	5	ANS
8	Payee name	C	67 - 80	14	ANS

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11.1 Record type

A code that identifies the type of record.

Usage: Mandatory

Position: 01 – 02

Size: 2

Type: N Numeric

Defined

Values: '26' Check Detail
Addendum A Record**11.2 Correcting institution routing number**

A number which identifies the ECE institution that corrects any data on the Check Detail Record (type 25).

Usage: Conditional. Shall be present if any data on the Check Detail Record (type 25) has been corrected.

Position: 03 – 11

Size: 9

Type: N Numeric

Format: TTTTAAAAC, where:

TTTT Federal Reserve Routing
Symbol

AAAA ABA Institution Identifier

C Check Digit

11.3 Bank of First Deposit (BFD) routing number

A number that identifies the bank of first deposit.

Usage: Conditional. Shall be present if available, unless omitted under clearing arrangements.

Position: 12 – 20

Size: 9

Type: NB Numericblank

Format: TTTTAAAAC, where:

TTTT Federal Reserve Routing
Symbol

AAAA ABA Institution Identifier

C Check Digit

11.4 BFD business (endorsement) date

The year, month, and day in the endorsement that designates the business date at the bank of first deposit.

Usage: Conditional. Shall be present if available, unless omitted under clearing arrangements.

Position: 21 – 28

Size: 8

Type: N Numeric

Format: YYYYMMDD, where:

YYYY year

MM month

DD day

Defined

Values: YYYY '1993' through '9999'

MM '01' through '12'

DD '01' through '31'

11.5 BFD item sequence number

A number that identifies the item at the bank of first deposit.

Usage: Conditional. Shall be present if available, unless omitted under clearing arrangements.

Position: 29 – 43

Size: 15

Type: NB Numericblank

11.6 Deposit account number at BFD

A number that identifies the depository account at the bank of first deposit.

Usage: Conditional. Shall be present if available, unless omitted under clearing arrangements.

Position: 44 – 61

Size: 18

Type: ANS Alphameric/Special

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11.7 BFD deposit branch

A code that identifies the branch at the bank of first deposit.

Usage: Conditional. Shall be present if available, unless omitted under clearing arrangements.

Position: 62 – 66

Size: 5

Type: ANS Alphameric/Special

11.8 Payee name

The name of the payee from the check.

Usage: Conditional. Shall be present if available, unless omitted under clearing arrangements.

Position: 67 – 80

Size: 14

Type: ANS Alphameric/Special

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12 Check Detail Addendum B Record (Type 27)

The Check Detail Addendum B Record is conditional and contains five fields. It shall be present only under clearing arrangements. It is one of two addenda available for use with the Check Detail Record (Type 25).

FIELD	FIELD NAME	USAGE	POSITION	SIZE	TYPE
1	Record type	M	01 - 02	2	N
2	Microfilm archive sequence number	C	03 - 17	15	NB
3	Image archive sequence number	C	18 - 41	24	NB
4	User field	C	42 - 65	24	ANS
5	Reserved	M	66 - 80	15	B

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12.1 Record type

A code that identifies the type of record.

Usage: Mandatory

Position: 01 – 02

Size: 2

Type: N Numeric

Defined Values: '27' Check Detail Addendum B Record

Usage: Mandatory

Position: 66 – 80

Size: 15

Type: B Blank

12.2 Microfilm archive sequence number

A number that identifies the item in the microfilm archive system; it may be different than the ECE Item Sequence Number and the Image Archive Sequence Number.

Usage: Conditional. Shall be present only under clearing arrangements.

Position: 03 – 17

Size: 15

Type: NB Numericblank

12.3 Image archive sequence number

A number that identifies the item in the image archive system; it may be different than the ECE Item Sequence Number and the microfilm Archive Sequence Number.

Usage: Conditional. Shall be present only under clearing arrangements.

Position: 18 – 41

Size: 24

Type: NB Numericblank

12.4 User Field

A field used at the discretion of users of the standard.

Usage: Conditional. Shall be present only under clearing arrangements.

Position: 42 – 65

Size: 24

Type: ANS Alphameric/Special

12.5 Reserved

A field reserved for future use by the Accredited Standards Committee X9.

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13 Return Record (Type 31)

The Return Record is conditional, and contains eleven fields; it shall be present in a bundle designated as return notification with a collection type indicator of '03' return Request for Truncated Items, '04' Return Notification, '05' Preliminary Return Information, or '06' Second Preliminary Return Information. One return record shall be sent for each electronic return. The record is created by the payor bank or the returning ECE institution.

FIELD	FIELD NAME	USAGE	POSITION	SIZE	TYPE
1	Record type	M	01 – 02	2	N
2	Payor bank routing number	M	03 – 10	8	N
3	Payor bank routing number check digit	C	11 – 11	1	NBSM
4	On Us return record	C	12 – 31	20	NBSMOS
5	Item Amount	M	32 – 41	10	N
6	Return reason	M	42 – 42	1	AN
7	Return record addendum count	M	43 – 43	1	N
8	Forward bundle creation date	C	44 – 51	8	N
9	ECE institution forward item sequence number	C	52 – 66	15	NB
10	Payor account name	C	67 – 79	13	ANS
11	User field	C	80 – 80	1	ANS

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13.1 Record type

A code that identifies the type of record.

Usage: Mandatory

Position: 01 – 02

Size: 2

Type: N Numeric

Defined

Values: '31' Return Record

13.2 Payor bank routing number

A number that identifies the institution by or through which the item is payable.

Usage: Mandatory

Position: 03 – 10

Size: 8

Type: N Numeric

Format: TTTTAAAA, where:

TTTT Federal Reserve Routing
Symbol

AAAA ABA Institution Identifier

13.3 Payor bank routing number check digit

A digit used with a modular check digit routine to validate the routing number.

Usage: Conditional. Shall be present if on the MICR line.

Position: 11 – 11

Size: 1

Type: NBSM Numericblank/special MICR

Format: C Check Digit

13.4 On Us return record

The On Us data from the incoming check detail record (type 25). On Us data usually consists of the payor's account number, a serial number or transaction code, or both.

Usage: Conditional. Shall be present if available, unless omitted under clearing arrangements.

Position: 12 – 31

Size: 20

Type: NBSMOS Numeric blank/Special
MICR On us**13.5 Item amount**

The US dollar value of the check.

Usage: Mandatory

Position: 32 – 41

Size: 10

Type: N Numeric

13.6 Return reason

A code which indicates the reason for non-payment.

Usage: Mandatory

Position: 42 – 42

Size: 1

Type: AN Alphameric

Defined

Values: A' NSF - Not Sufficient
Funds

'B' UCF - Uncollected Funds Hold

'C' Stop Payment

'D' Closed Account

'E' UTLA - Unable to Locate Account

'F' Frozen/Blocked Account

'G' Stale Dated

'H' Post Dated

'I' Endorsement Missing

'J' Endorsement Irregular

'K' Signature Missing

'L' Signature Irregular

'M' Non-Cash Item

'N' Altered/Fake Item

'O' Mutilated Item

'P' Item Exceeds Dollar Limit

'Q' Not Authorized

'R' Branch/Account Sold

'S' Refer to Maker

'T' Stop Payment Suspect

13.7 Return record addendum count

The number of return record addenda to follow.

Usage: Mandatory

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Position: 43 – 43

Size: 1

Type: N Numeric

Defined

Values: '0' No Addenda
 '1' One Addendum to Follow
 '2' Two Addenda to Follow
 '3' Three Addenda to Follow

13.8 Forward bundle creation date

For electronic check exchange items, the year, month, and day that the forward bundle was created.
 For items presented in paper cash letters, the year, month, and day that the cash letter was created.

Usage: Conditional. Shall be present if items are presented electronically. If items are presented through a paper cash letter shall be present if available.

Position: 44 – 51

Size: 8

Type: N Numeric

Format: YYYYMMDD, where:

YYYY year

MM month

DD day

Defined

Values: YYYY '1993' through '9999'
 MM '01' through '12'
 DD '01' through '31'

13.9 ECE Institution forward item sequence number

A number which identifies the item. If the item is presented electronically, the number is assigned by the ECE institution; if the item is presented through a paper cash letter, the number is assigned by the bank of first deposit.

Usage: Conditional. Shall be present if items are presented electronically. If items are presented through a paper cash letter, shall be present if available.

Position: 52 – 66

Size: 15

Type: NB Numericblank

13.10 Payor account name

The account name from payor bank records.

Usage: Conditional. Shall be present only under clearing arrangements

Position: 67 – 79

Size: 13

Type: ANS Alphameric/Special

13.11 User field

A field used at the discretion of users of the standard.

Usage: Conditional. Shall be present only under clearing arrangements.

Position: 80 – 80

Size: 1

Type: ANS Alphameric/Special

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14 Return Addendum A Record (Type 32)

The Return Addendum A Record is conditional and contains thirteen fields. It shall be present unless omitted under clearing arrangements. It is one of three addenda available for use with the Return Record (Type 31).

FIELD	FIELD NAME	USAGE	POSITION	SIZE	TYPE
1	Record type	M	01 - 02	2	N
2	Bank of first deposit (BFD) routing number	C	03 - 11	9	NB
3	BFD business (endorsement) date confidence indicator	C	12 - 12	1	AN
4	BFD business (endorsement) date	C	13 - 20	8	N
5	BFD item sequence number confidence indicator	C	21 - 21	1	AN
6	BFD item sequence number	C	22 - 36	15	NB
7	Deposit account number at BFD confidence indicator	C	37 - 37	1	AN
8	Deposit account number at BFD	C	38 - 55	18	ANS
9	BFD deposit branch confidence indicator	C	56 - 56	1	AN
10	BFD deposit branch	C	57 - 61	5	ANS
11	Payee name confidence indicator	C	62 - 62	1	AN
12	Payee name	C	63 - 76	14	ANS
13	Reserved	M	77 - 80	4	B

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14.1 Record type

A code that identifies the type of record.

Usage: Mandatory
 Position: 01 – 02
 Size: 2
 Type: N Numeric
 Defined Values: '32' Return Addendum A Record

14.2 Bank of first deposit (BFD) routing number

A number that identifies the bank of first deposit.

Usage: Conditional. Shall be present if available, unless omitted under clearing arrangements.
 Position: 03 – 11
 Size: 9
 Type: NB Numericblank
 Format: TTTTAAAAC, where:
 TTTT Federal Reserve Routing Symbol
 AAAA ABA Institution Identifier
 C Check Digit

14.3 BFD business (endorsement) date confidence indicator

A code that indicates whether or not the paying bank is sure of the accuracy of the data.

Usage: Conditional. Shall be present if the following field is present.
 Position: 12 – 12
 Size: 1
 Type: AN Alphameric
 Defined Values: 'Y' sure of content
 'N' content in doubt
 Blank following field not provided

14.4 BFD business (endorsement) date

The year, month, and day in the endorsement that designates the business date at the bank of first deposit.

Usage: Conditional. Shall be present if available, unless omitted under clearing arrangements.

Position: 13 – 20
 Size: 8
 Type: N Numeric
 Format: YYYYMMDD, where:
 YYYY year
 MM month
 DD day

Defined Values: YYYY '1993' through '9999'
 MM '01' through '12'
 DD '01' through '31'

14.5 BFD item sequence number confidence indicator

A code that indicates whether or not the paying bank is sure of the accuracy of the data.

Usage: Conditional. Shall be present if the following field is present.
 Position: 21 – 21
 Size: 1
 Type: AN Alphameric
 Defined Values: 'Y' sure of content
 'N' content in doubt
 Blank following field not provided

14.6 BFD item sequence number

The number that identifies the item at the bank of first deposit.

Usage: Conditional. Shall be present if available, unless omitted under clearing arrangements.
 Position: 22 – 36
 Size: 15
 Type: NB Numericblank

14.7 Deposit account number at BFD confidence indicator

A code that indicates whether or not the paying bank is sure of the accuracy of the data.

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Usage: Conditional. Shall be present if the following field is present.

Position: 37 - 37

Size: 1

Type: AN Alphameric

Defined Values: 'Y' sure of content
'N' content in doubt
Blank following field not provided

14.8 Deposit account number at BFD

A number that identifies the depository account at the bank of first deposit.

Usage: Conditional. Shall be present if available, unless omitted under clearing arrangements.

Position: 38 - 55

Size: 18

Type: ANS Alphameric/Special

14.9 BFD deposit branch confidence indicator

A code that indicates whether or not the paying bank is sure of the accuracy of the data.

Usage: Conditional. Shall be present if the following field is present.

Position: 56 - 56

Size: 1

Type: AN Alphameric

Defined Values: 'Y' sure of content
'N' content in doubt
Blank following field not provided

14.10 BFD deposit branch

A code that identifies the branch at the bank of first deposit.

Usage: Conditional. Shall be present if available, unless omitted under clearing arrangements.

Position: 57 - 61

Size: 5

Type: ANS Alphameric/Special

14.11 Payee name confidence indicator

A code that indicates whether or not the paying bank is sure of the accuracy of the data.

Usage: Conditional. Shall be present if the following field is present

Position: 62 - 62

Size: 1

Type: AN Alphameric

Defined Values: 'Y' sure of content
'N' content in doubt
Blank following field not provided

14.12 Payee name

The name of payee from the check.

Usage: Conditional. Shall be present if available, unless omitted under clearing arrangements.

Position: 63 - 76

Length: 14

Type: ANS Alphameric/Special

14.13 Reserved

A field reserved for future use by the Accredited Standards Committee X9.

Usage: Mandatory

Position: 77 - 80

Length: 4

Type: B Blank

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15 Return Addendum B Record (Type 33)

The Return Addendum B Record is conditional and contains six fields. It shall be present unless omitted under clearing arrangements. It is one of three addenda available for use with the Return Record (Type 31).

FIELD	FIELD NAME	USAGE	POSITION	SIZE	TYPE
1	Record type	M	01 – 02	2	N
2	Payor bank name	C	03 – 20	18	A
3	Payor account name extension	C	21 – 40	20	ANS
4	Auxiliary On Us	C	41 – 55	15	NBSM
5	External processing code	C	56 – 56	1	NBSM
6	Reserved	M	57 – 80	24	B

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15.1 Record type

A code that identifies the type of record.

Usage: Mandatory

Position: 01 – 02

Size: 2

Type: N Numeric

Defined

Values: '33' Return Addendum B Record

15.2 Payor bank name

The short name of the institution by or through which the item is payable.

Usage: Conditional. Shall be present unless omitted under clearing arrangements

Position: 03 – 20

Size: 18

Type: A Alphabetic

15.3 Payor account name extension

An extension of the account name from payor bank records.

Usage: Conditional. Shall be present if necessary to complete the payor account name, unless omitted under clearing arrangements.

Position: 21 – 40

Size: 20

Type: ANS Alphameric/Special

15.4 Auxiliary On Us

A code used on commercial checks at the discretion of the payor bank.

Usage: Conditional. Shall be present if available, unless omitted under clearing arrangements.

Position: 41 – 55

Size: 15

Type: NBSM Numericblank/Special MICR

15.5 External processing code

A code used for special purposes as authorized by the Accredited Standards Committee X9. Also known as Position 44.

Usage: Conditional. Shall be present if available, unless omitted under clearing arrangements.

Position: 56 – 56

Size: 1

Type: NBSM Numericblank/Special MICR

15.6 Reserved

A field reserved for future use by the Accredited Standards Committee X9.

Usage: Mandatory

Position: 57 – 80

Size: 24

Type: B Blank

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16 Return Addendum C Record (Type 34)

The Return Addendum C Record is conditional and contains five fields. It shall be present only under clearing arrangements. It is one of three addenda available for use with the Return Record (Type 31).

FIELD	FIELD NAME	USAGE	POSITION	SIZE	TYPE
1	Record type	M	01 – 02	2	N
2	Forward microfilm archive sequence number	C	03 – 17	15	NB
3	Forward image archive sequence number	C	18 – 41	24	NB
4	User field	C	42 – 65	24	ANS
5	Reserved	M	66 – 80	15	B

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16.1 Record type

A code that identifies the type of record.

Usage: Mandatory

Position: 01 – 02

Size: 2

Type: N Numeric

Defined

Values: '34' Return Addendum C
Record**16.2 Forward microfilm sequence number**

A number that identifies the item in the Microfilm Archive System, taken from the incoming Check Detail Addendum B record; it may be different than the ECE Institution Item Sequence Number and the Image Archive Sequence Number.

Usage: Conditional. Shall be present only under clearing arrangements

Position: 03 – 17

Size: 15

Type: NB Numericblank

16.3 Forward image archive sequence number

A number that identifies the item in the image archive system, taken from the incoming Check Detail Addendum B record; it may be different than the ECE Institution Forward Item Sequence Number and the Forward Microfilm Archive Sequence Number.

Usage: Conditional. Shall be present only under clearing arrangements.

Position: 18 – 41

Size: 24

Type: NB Numericblank

16.4 User field

A field used at the discretion of users of the standard.

Usage: Conditional. Shall be present only under clearing arrangements.

Position: 42 – 65

Size: 24

Type: ANS Alphameric/Special

16.5 Reserved

A field reserved for future use by the Accredited Standards Committee X9.

Usage: Mandatory

Position: 66 – 80

Size: 15

Type: B Blank

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17 Bundle Control Record (Type 70)

The Bundle Control Record is mandatory, and contains six fields. There shall be one Bundle Control Record corresponding to each Bundle Header Record (Type 20). The data in the fields are generated by the ECE institution that created the corresponding Bundle Header Record.

FIELD	FIELD NAME	USAGE	POSITION	SIZE	TYPE
1	Record type	M	01 – 02	2	N
2	Items within bundle count	M	03 – 06	4	N
3	Bundle total amount	M	07 – 18	12	N
4	MICR valid total amount	C	19 – 30	12	N
5	User field	C	31 – 78	48	ANS
6	Reserved	M	79 – 80	2	B

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17.1 Record type

A code that identifies the type of record.

Usage: Mandatory

Position: 01 – 02

Size: 2

Type: N Numeric

Defined

Values: '70' Bundle Control Record

17.2 Items within bundle count

The total number of items sent within a bundle, all check detail records (type 25) or all return records (type 31).

Usage: Mandatory

Position: 03 – 06

Size: 4

Type: N Numeric

17.3 Bundle total amount

The total US dollar value of the items within the bundle, all check detail records (type 25) or all return records (type 31).

Usage: Mandatory

Position: 07 – 18

Size: 12

Type: N Numeric

17.4 MICR valid total amount

The total US dollar value of all check detail records (type 25) which contain the value '1' in the MICR valid indicator field.

Usage: Conditional. Shall be present only under clearing arrangements.

Position: 19 – 30

Size: 12

Type: N Numeric

17.5 User field

A field used at the discretion of users of the standard.

Usage: Conditional. Shall be present only under clearing arrangements.

Position: 31 – 78

Size: 48

Type: ANS Alphameric/Special

17.6 Reserved

A field reserved for future use by the Accredited Standards Committee X9.

Usage: Mandatory

Position: 79 – 80

Size: 2

Type: B Blank

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18 Box Summary Record (Type 75)

The Box Summary Record is conditional and contains seven fields. It shall be present only under clearing arrangements. It is generated by the ECE institution, and contains data related to box processing. There shall be one Box Summary Record per box (box of bundles). Cash letters that have Box Summary Records and those that do not, may be commingled within a single ECE file.

FIELD	FIELD NAME	USAGE	POSITION	SIZE	TYPE
1	Record type	M	01 - 02	2	N
2	Final destination routing number	M	03 - 11	9	N
3	Box sequence number	M	12 - 14	3	N
4	Box bundle count	M	15 - 18	4	N
5	Box number ID	M	19 - 26	8	N
6	Box total amount	M	27 - 40	14	N
7	Reserved	M	41 - 80	40	B

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18.1 Record type

A code that identifies the type of record.

Usage: Mandatory

Position: 01 - 02

Size: 2

Type: N Numeric

Defined

Values: '75' Box Summary Record

18.2 Final destination routing number

A number that identifies the institution that receives and processes the cash letter or the bundle.

Usage: Mandatory

Position: 03 - 11

Size: 9

Type: N Numeric

Format: TTTTAAAAC, where:

TTTT Federal Reserve Routing
Symbol

AAAA ABA Institution Identifier

C Check Digit

18.3 Box sequence number

A number assigned by the institution that creates the box. Usually denotes the relative position of the box within the cash letter.

Usage: Mandatory

Position: 12 - 14

Size: 3

Type: N Numeric

18.4 Box bundle count

The total number of bundles in the box.

Usage: Mandatory

Position: 15 - 18

Size: 4

Type: N Numeric

18.5 Box number ID

A code that identifies the box, assigned by the institution that creates the box.

Usage: Mandatory

Position: 19 - 26

Size: 8

Type: N Numeric

18.6 Box total amount

The total US dollar value of the bundles in the box.

Usage: Mandatory

Position: 27 - 40

Size: 14

Type: N Numeric

18.7 Reserved

A field reserved for future use by the Accredited Standards Committee X9.

Usage: Mandatory

Position: 41 - 80

Size: 40

Type: B Blank

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19 Routing Number Summary Record (Type 85)

The Routing Number Summary Record is conditional and contains five fields. It shall be present only under clearing arrangements. When used, there is one record for each payor bank Routing Number represented in the cash letter. The data is generated by the ECE institution.

FIELD	FIELD NAME	USAGE	POSITION	SIZE	TYPE
1	Record type	M	01 - 02	2	N
2	Routing number within cash letter	M	03 - 11	9	NB
3	Routing number total amount	M	12 - 25	14	N
4	Routing number items count	M	26 - 31	6	N
5	Reserved	M	32 - 80	49	B

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19.1 Record type

A code that identifies the type of record.

Usage: Mandatory

Position: 01 - 02

Size: 2

Type: N Numeric

Defined

Values: '85' Routing Number Summary
Record**19.2 Routing number within cash letter**

A number that identifies a given payor bank within a cash letter containing one or more payor banks.

Usage: Mandatory

Position: 03 - 11

Size: 9

Type: NB Numericblank

Format: TTTTAAAAC, where:

TTTT Federal Reserve Routing
Symbol

AAAA ABA Institution Identifier

C Check Digit

19.3 Routing number total amount

The total US dollar value for all check detail records (type 25) associated with the payor bank routing number designated in the field "Routing Number within Cash Letter".

Usage: Mandatory

Position: 12 - 25

Size: 14

Type: N Numeric

19.4 Routing number items count

The total number of all check detail records (type 25) associated with the payor bank routing number designated in the field "Routing Number within Cash Letter".

Usage: Mandatory

Position: 26 - 31

Size: 6

Type: N Numeric

19.5 Reserved

A field reserved for future use by the Accredited Standards Committee X9.

Usage: Mandatory

Position: 32 - 80

Size: 49

Type: B Blank

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20 Cash Letter Control Record (Type 90)

The Cash Letter Control Record is mandatory and contains eight fields. There must be one cash letter control record corresponding to each cash letter header record (type 10). The data in the fields are generated by the ECE institution that created the corresponding cash letter header record.

FIELD	FIELD NAME	USAGE	POSITION	SIZE	TYPE
1	Record type	M	01 - 02	2	N
2	Bundle count	M	03 - 08	6	N
3	Items within cash letter count	M	09 - 16	8	N
4	Cash letter total amount	M	17 - 30	14	N
5	Final destination name	C	31 - 48	18	A
6	ECE institution name	C	49 - 66	18	A
7	Settlement date	C	67 - 74	8	N
8	Reserved	M	75 - 80	6	B

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20.1 Record type

A code that identifies the type of record.

Usage: Mandatory

Position: 01 - 02

Size: 2

Type: N Numeric

Defined

Values: '90' Cash Letter Control Record

20.2 Bundle count

The total number of bundles within the cash letter.

Usage: Mandatory

Position: 03 - 08

Size: 6

Type: N Numeric

20.3 Items within cash letter count

The total number of items sent within the cash letter, all check detail records (type 25) or all return records (type 31).

Usage: Mandatory

Position: 09 - 16

Size: 8

Type: N Numeric

20.4 Cash letter total amount

The total US dollar value of the cash letter, all check detail records (type 25) or all return records (type 31).

Usage: Mandatory

Position: 17 - 30

Size: 14

Type: N Numeric

20.5 Final destination name

The short name of the institution that receives and processes the cash letter.

Usage: Conditional. Shall be present, unless omitted under clearing arrangements.

Position: 31 - 48

Size: 18

Type: A Alphabetic

20.6 ECE Institution name

The short name of the institution that creates the Cash Letter Control Record (Type 90).

Usage: Conditional. Shall be present, unless omitted under clearing arrangements.

Position: 49 - 66

Size: 18

Type: A Alphabetic

20.7 Settlement date

The year, month, and day that the institution that creates the cash letter expects settlement.

Usage: Conditional. Shall be present only under clearing arrangements.

Position: 67 - 74

Size: 8

Type: N Numeric

Format: YYYYMMDD, where:

YYYY year

MM month

DD day

Defined

Values: YYYY '1993' through '9999'

MM '01' through '12'

DD '01' through '31'

20.8 Reserved

A field reserved for future use by the Accredited Standards Committee X9.

Usage: Mandatory

Position: 75 - 80

Size: 6

Type: B Blank

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21 File Control Record (Type 99)

The File Control Record is mandatory and contains eight fields. It is the final record of an electronic check exchange file. The data in the fields are created by the institution sending the file, the immediate origin institution.

FIELD	FIELD NAME	USAGE	POSITION	SIZE	TYPE
1	Record type	M	01 - 02	2	N
2	Cash letter count	M	03 - 08	6	N
3	Total records count	M	09 - 16	8	N
4	Total items count	M	17 - 24	8	N
5	File total Amount	M	25 - 40	16	N
6	Immediate origin contact name	C	41 - 54	14	ANS
7	Immediate origin contact phone number	C	55 - 64	10	N
8	Reserved	M	65 - 80	16	B

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21.1 Record type

A code that identifies the type of record.

Usage: Mandatory
 Position: 01 - 02
 Size: 2
 Type: N Numeric
 Defined
 Values: '99' File Control Record

21.2 Cash letter count

The total number of cash letters within the electronic check exchange file.

Usage: Mandatory
 Position: 03 - 08
 Size: 6
 Type: N Numeric

21.3 Total records count

The total number of records of all types sent in the ECE file, including the file control record.

Usage: Mandatory
 Position: 09 - 16
 Size: 8
 Type: N Numeric

21.4 Total items count

The total number of items sent within the ECE file, all check detail records (type 25) and all return records (type 31).

Usage: Mandatory
 Position: 17 - 24
 Size: 8
 Type: N Numeric

21.5 File total amount

The total US dollar value of the complete ECE file, all check detail records (type 25) and all return records (type 31).

Usage: Mandatory
 Position: 25 - 40
 Size: 16
 Type: N Numeric

21.6 Immediate origin contact name

A contact at the institution that creates the ECE file.

Usage: Conditional. Shall be present, unless omitted under clearing arrangements.
 Position: 41 - 54
 Size: 14
 Type: ANS Alphameric/Special

21.7 Immediate origin contact phone number

The phone number of the contact at the institution that creates the ECE file.

Usage: Conditional. Shall be present, unless omitted under clearing arrangements.
 Position: 55 - 64
 Size: 10
 Type: N Numeric

21.8 Reserved

A field reserved for future use by the Accredited Standards Committee X9.

Usage: Mandatory
 Position: 65 - 80
 Size: 16
 Type: B Blank

**Annex A
(normative)**

Standard On-Us field format

A.1 ANS X9.13 definition of the On-Us field

The structure and use of the Standard On-Us Field Format is mandated by the structure and use of the On-Us Field in ANS X9.13.¹ Under that standard, the On-Us Field is located "between the Amount and Routing fields in positions 13 through 32," and "defines the boundaries within which On-Us data may appear, typically the Account Number, and optionally, a serial number and/or transaction code."

ANS X9.13 imposes few additional requirements on the structure and contents of the field. It does require that the On-Us Symbol always appear to the right of the Account Number. It allows one additional On-Us Symbol in the On-Us Field to bracket MICR numerical data. The Dash Symbol may be used as a separator in the On-Us field, however, the ANS X9.13 standard recommends that issuing institutions consider the use of blank spaces to serve the same purpose. The maximum number of characters allowed in the field is 19.

A.2 Standard On-Us field format

Prior to the development of ECE, collecting banks were only required to capture the dollar amount and routing number from the paying bank's check. Therefore, collecting banks typically read transit checks utilizing the same logic used in reading their On-Us checks, recognizing fields pertinent to their own internal systems and ignoring other data. Since in the ECE environment paying banks need their own MICR lines to process, this approach causes problems.

Because ANS X9.13 allows paying banks flexibility in the design of the On-Us Field on their physical checks, its structure can vary from bank to bank. Since this field is not uniformly structured by all banks, paying banks cannot easily communicate their On-Us structure to all collecting banks. Without knowing each paying bank's On-Us Field structure, the collecting bank cannot always interpret the On-Us Field accurately in order to place discrete data elements from the On-Us Field of the physical document into their corresponding discrete fields within an ECE file.

In order to accommodate the flexibility allowed in ANS X9.13, ANS X9.37 requires that the collecting bank capture the entire On-Us Field from the physical check. The collecting bank must be able to place the On-Us Field from the Physical check into the On-Us Field of the ECE file intact and in the same sequence as it appears on the physical check. Blanks are to be suppressed, dashes are optional and each On-Us Symbol must be translated to a forward slash ('/').²

¹⁾ ANS X9.13 (1999): Specifications for Placement and Location of MICR Printing

²⁾ This usage of forward slash does not apply to the capture and transmission of the MICR On Us symbol as used in other fields of the MICR line (e.g. Aux On Us Field)

Annex B (normative)

Interim On-Us field fixed format

B.1 Issue

In a paper environment, a collecting bank is only concerned with the Routing Number and Dollar Amount fields on the MICR line of a Transit check. However, in an ECE environment, the collecting bank must also provide the On-Us Field which contains paying bank posting information such as the account number and check serial number. In the process of developing this standard, the working group discovered variability in the use of the 19-position On-Us MICR Field, all of it compliant with ANSI X9.13.

B.2 Background

The structure of the 19-position On-Us Field on the MICR line is left to the discretion of the paying bank. The On-Us symbol must always appear to the right of the account number. A second, optional On-Us symbol may be used to bracket MICR numerical data. Data placed to the left of this second On-Us symbol may be referred to as Optional Field Four. Since ECE checks require all relevant On-Us data in order to post, the issue is how the collecting bank should capture and forward this information to the paying bank. For a more detailed discussion of On Us Field issues, please refer to Annex A.

B.3 Objective

The objective of this annex is to define an option, referred to as the Fixed Format Option, which provides a migratory path for financial institutions which wish to participate in ECE and have systems which capture in fixed field-format. At present, these systems may not recognize and accommodate all the data which can be contained in the On Us field of the check MICR line.

It should be noted that the working group was aware that financial institutions had ECE development projects already in place. It was the working group's intention to provide the widest possible latitude for financial institutions to develop and implement ECE. However, it is to be emphasized that the option presented in this annex should be viewed as an interim solution, to facilitate development efforts already in progress and to be implemented under clearing arrangements. It is the intention of the working group to remove this annex at the five year review.

B.4 Interim fixed format option

The Interim On-Us Field Fixed Format option allows users to define the MICR On-Us Field, on both the Forward Presentment Check Detail Record (Type 25) and the Return Record (Type 31) as two discrete fixed-length fields.

This option may only be used when the MICR line has the following characteristics:

- The On-Us Field contains only one On-Us Symbol
- The On-Us symbol is printed to the right of the account number
- The account number contains no more than 14 characters
- The Process Control Field contains no more than 6 characters¹

¹⁾ The use of 20 bytes for the On Us field in no way suggests that 20 characters can physically be accommodated on the MICR line

Annex C (normative)

Interim Payor Bank Routing Number Check Digit Treatment

C.1 Issue

The Check Detail Record (Type 25) and the Return Record (Type 31) define how information located on the check MICR line shall be formatted and transmitted. These records require that all information appearing in the MICR line shall be placed in record type 25 or record type 31, and transmitted to the final destination of the file. However, many financial institutions today do not currently capture, store, or transmit all information found on the check MICR line¹. One piece of MICR line information not always captured, stored, or transmitted is the Payor Bank Routing Number Check Digit.

C.2 Objective

The objective of this annex is to define an alternative treatment of the Payor Bank Routing Number Check Digit. This alternative will provide a migratory path for financial institutions which wish to participate in ECE and have systems which do not capture, store, or transmit all information found on the check MICR line.

It should be noted that the working group was aware that financial institutions had ECE development projects already in place. It was the working group's intention to provide the widest possible latitude for financial institutions to develop and implement ECE. However, it is to be emphasized that the alternative presented in this annex should be viewed as an interim solution, to facilitate development efforts already in progress and to be implemented under clearing arrangements. It is the intention of the working group to remove this annex at the next five year review.

C.3 Interim Payor Bank Routing Number Check Digit Treatment

Within the check detail record (type 25) and the return record (type 31), the payor bank routing number check digit is assigned to field 10.5 and field 13.3 respectively; the usage condition assigned to these fields requires that if a payor bank routing number check digit is printed on the check, it shall be transmitted to the final destination financial institution. The interim treatment for field 10.5 and field 13.3 would allow the ECE institution to eliminate the payor bank routing number check digit from the check detail record, even if the check digit appears on the check. As noted in section C.2, this alternative treatment may only be used under clearing arrangements.

¹ The standard does not dictate how a financial institution obtains the payor bank routing number check digit. It would be permissible, for example, to calculate the digit prior to the creation of the ECE file

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Annex D
(informative)
MICR valid indicator

D.1 Use of the MICR valid indicator

The MICR Valid Indicator is a conditional one character field in the Check Detail Record (Type 25); it is present only under clearing arrangements. Not all banks exchanging ECE files will use the field. There are, however, three reasons for using the field which ECE institutions may wish to consider. One relates to paper handling, two relate to accounting.

D.2 Paper Handling

The collecting bank may use the MICR Valid Indicator field to notify the paying bank that it has identified a problem in reading the MICR line of the check; either a field is missing (e.g. On Us Field) or the collecting bank's capture system discerns the presence of a MICR character but cannot interpret it, replacing the unreadable character with an " * ". Use of values other than "Good Read (1)", in the MICR valid Indicator field, usually implies the check cannot be posted from the electronic file. Collecting banks may want to include checks on the file that will not be eligible for posting; when paper follows the ECE file, the collecting banks may prefer to include all checks on the file rather than sort these checks into separate pockets.

D.3 Accounting

This indicator will facilitate collecting bank's and paying bank's internal accounting for ECE.

D.3.1 Settlement

Exchanging banks may agree to perform two settlements, an initial settlement on the amount of the checks that can be posted from the ECE file and a second settlement based on the physical items.

D.3.2 Net Reciprocal Accounting

This process allows two banks electronically exchanging checks to net the dollar amount of the postable checks and use the net amount for posting purposes.

Annex E
(Informative)
Commingling of transaction types

E.1 Commingling of transaction types

Commingling is the act of mixing two or more different collection types in a single file under this standard. Collection types defined in the standard are: Forward Presentment, Forward Presentment-Same-day Settlement, Preliminary Return Information, Return Request for Truncated Items, and Return Notification. Commingling also refers to combining checks intended for multiple banks in the same bundle.

In general, collection types are not commingled except where permitted by rule, or by agreement between sender and receiver. Examples of commingling permissible under the standard are:

- Checks intended for multiple paying banks may be commingled in the same bundle, within a designated collection type, e.g., Forward Presentment.
- Qualified Return Checks (QRC) may be commingled within the Forward Presentment Collection Type and Forward Presentment - Same-day Settlement Collection Type bundles.
- Cash letters of different collection types may be commingled within a single file.

The Standard does not support:

- Bundles of Return Notifications and bundles of Preliminary Return Information Items commingled with bundles of Return Requests for Truncated Items in the same cash letter. Return Notifications and Preliminary Return Information items are informative and have no settlement value. Return Request for Truncated Items have settlement value, and therefore must be in a separate cash letter.

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J.1. 86 Truncation

The non-return of checks, either to the issuing bank or to the issuing individual, and the discard and destruction of the source paper document.

J.1. 87 Translator

Like FII-translator in a larger context that includes other applications, not just financial applications.

J.1. 88 View

A single instance of a digital image of an item. A single view typically would be of all, or a portion, of one face (i.e. front or back) of the item. A single item may be represented by multiple views comprising a view set.

J.1. 89 View parameters

Those data elements of a digital image which are required to interpret and process the image raster data correctly. Examples are the image size, spatial resolution, number of gray-scale levels, orientation, etc. The image parameters are usually included in the *view processing data*.

J.1. 90 View processing data

That portion of an interchange which contains information that allows the image raster data to be interpreted for correct rendering of a view of an imaged object.

J.1. 91 Workflow

In imaging software, a program that queues, tracks, and otherwise manages documents and collections of documents as they progress from entry into the system, through the various departments in the organization, to their final destination.

J.1. 92 Zone

A rectangular area within an image.

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J.1. 78 Spatial scan density

The number of pixels used to describe a region of an image of fixed spatial size.

J.1. 79 Supplier

The SUPPLIER ([S]) in this specification is the *FII-translator* for interaction between FII-system-user and FII-translator, and the *Transfer-Facility* for interactions between FII-translator and Transfer-Facility. The notion of SUPPLIER is imported from CCITT's X.403 [9]. Abstractly, the term identifies the generic role that an application entity plays in the exchange of interchanges. A SUPPLIER provides services consumed by a CONSUMER. For example, the FII-translator is a SUPPLIER which provides services consumed by an FII-system-user. Likewise, the Transfer-Facility is a SUPPLIER which provides services consumed by an FII-translator.

J.1. 80 Text

Alphanumeric characters and symbols represented by ASCII code.

J.1. 81 Thresholding

The process of converting a gray level image to a black/white representation. Typically this involves comparing each (gray) image pixel to a block of its neighboring pixels and, based on the relative differences in intensity, replacing that pixel's gray level with a "1" or "0".

J.1. 82 TIFF (Tag image file format)

A de-facto PC standard file format for image data. Its acceptance is world wide. TIFF files contain data elements encoded using a type-length-value encoding. Types are called tags which name the resolution, compression technique, length, etc. of the view processing data value that follows a tag. The length tells the TIFF decoder where the current tag's data value ends and where the next tag starts. The order of the tags is irrelevant. The TIFF standard is administered by Aldus Corporation.

J.1. 83 Transaction

A transaction is a physical or electronic representation of an exchange which represents a monetary value.

J.1. 84 Transaction Set

A Transaction Set is an ASC X12.6 defined EDI term which represents the collection of data representing one or more commercial transactions that is exchanged between the parties engaged in electronic data interchange. Each instance of a transaction set is composed of a specific group of segments that represent a single business document. Each transaction set consists of the transaction set header (ST) as the first segment and contains at least one data segment before the transaction set trailer (SE). A segment is the intermediate unit of information in a transaction set. Segments consist of logically related data elements in a defined sequence.

J.1. 85 Transcoding

Transcoding is a process of mapping the original compressed image data into new compressed image data such that the new compressed image data are different from the original compressed image data, regardless of compression algorithm(s) used. The transformation of image data compressed by one compression algorithm into image data compressed by a different algorithm is transcoding. Decompression of compressed image data followed by recompression using the same compression algorithm, is also a transcoding if the recompressed image data are not identical to the original compressed data.

2. *Non-Repudiation of Submission: provides the originator of data with irrevocable proof that the data was submitted to a server application.*
3. *Non-Repudiation of Delivery: Provides the originator of data with irrevocable proof that the data was delivered to the intended recipient (application).*

J.1.72 Resolution

Resolution identifies the relative degree of an image's visual acuity, or it is a measure of capability to delineate picture detail.

In electronic imaging, specific pattern and number of pixels sampled (commonly stated in units of "pixels per inch").

NOTE - Resolution in general is a word with many connotations. Sampling Resolution, or addressability, as defined above, relates only to the number of individual samples taken per unit distance during the scanning process. Other aspects of an image system, e.g. the lens, image motion or blur, array cross-talk, can reduce the visual sharpness of an image. A better scientific method for defining overall system resolution is the MTF (Modulation Transfer Function) or CTF (Contrast Transfer Function).

J.1.73 Run-length encoding

The transmission of numbers describing the lengths of white and black regions of an image rather than sending separately each black or white pixel. Such encoding is the basis for many of the data compression methods used in digital representation of images.

J.1.74 Scaling

The process of converting an image from one resolution to another. For example, if an image scanned at 300 dpi needs to be printed at 200 dpi, a 3-to-2 scaling operation is needed. Scaling reduces or increases the number of pixels used to represent the picture. Consequently, the size of the image object is increased or decreased accordingly. Numerous algorithms can be used to scale image data up (increase the resolution) or down (decrease the resolution).

NOTE - A scaling operation which increases resolution does not increase the information content or detail - e.g. scaling a 200 dpi image to 300 dpi does not increase the image quality.

J.1.75 Scan line

A scan line is the building block of a raster image. It is a contiguous string of pixels.

Each scan line contains X pixels. An image is made up of Y scan lines. The pixels in an image form a matrix of Y rows and X columns. The pixels in the first scan line form the first row of the matrix. The first column in the matrix includes the first pixel in each scan line.

J.1.76 Services

Application to application interchange including, for example, receipt verification, re-transmission, acknowledgment, transmission request, etc.

J.1.77 Snippet

An item view representing a portion or subset of an item face. A snippet is a "partial" view of an imaged item. The view conveyed in the snippet will generally be a named region of interest of the item face, such as, the courtesy amount zone, payee line, signature, etc. It is a portion of the original item's image raster data.

X9.46-1997**J.1. 65 Page**

A page is the basic building block or "unit of work" used to create a document. A page corresponds to a rectangular area that is used for presenting the content of a document on a physical medium. A document is a logical collection of pages.

The contents of a page are defined by the document application. A page may consist of any combination of text, images, and graphics. For example, a page may contain one or more images of item views for presentation.

J.1. 66 Partial view

See Snippet

J.1. 67 Pel (picture element)

See pixel.

J.1. 68 Pixel (picture element or pel)

The smallest addressable point of a digital image. For a black/white image, a pixel is represented as one bit (i.e. 0 or 1). For a gray-scale image, the number of bits used to represent a pixel depends on the number of gray levels which can be rendered for each pixel (for example, a digital gray-scale image whose pixels can represent one of 256 levels of gray would have each pixel represented as an 8-bit byte).

J.1. 69 Port

The term **PORT** is a modeling tool. It is imported from CCITT's X.403 [9] for the purpose of clarifying *what* is exchanged between abstract application entities across their interface. It clarifies, although in abstract terms, the functionality (in the form of operations) that is provided by the supplier to the consumer of the service. Although the precise application interface is not specified, the abstract operations that are either *consumed* by the user abstract application or *supplied* by the For instance, the FI-system-user (the financial institution's image capture application) would be a consumer of services of the FI-translator that is defined in this specification.

The term abstract is used because *how* the implementation provides these services across its interface is outside of the scope of this specification.

NOTE - One logical consequence of the port notation is that one could easily extend this notation into an application program interface by applying a little imagination.

J.1. 70 Protocol

Rules, definitions, data structures and recommendations that specify how two systems should interact and exchange data.

J.1. 71 Repudiation

Repudiation is the ability of someone to refute the claim of someone else that they were involved in a data exchange or handled a data item. Security services to protect against such a situation are called Non-Repudiation services. Most often, digital signatures are used to provide this service:

NOTE - repudiation is Normally spoken of in terms of Non-repudiation Services.

Hence, Non-Repudiation Services provide Irrevocable proof to a third party after an event occurs that the event occurred as claimed. Three specific instances of Non-Repudiation Services are as follows:

1. *Non-Repudiation of Origin: Provides the recipient of data with irrevocable proof of the origin of the data, its contents, and its associated security label.*

J.1. 55 JBIG

Acronym for Joint Bi-level Image Group. JBIG is an international ISO/CCITT standard for compressing bitonal image raster data. It defines the compression scheme, parameters, and raster encoding to be interpreted for the proper rendition of the image.

J.1. 56 JPEG

Acronym for Joint Photographic Experts Group. JPEG is an international standard for compressing continuous tone (gray-scale and color) image data. It defines the compression scheme, parameters and raster encoding to be interpreted for the proper rendition of the image.

J.1. 57 Lossless compression

Compression where the original (source) image data prior to compression can be recovered exactly (bit for bit) from the compressed image data.

J.1. 58 Local time

Local time is the time measured at the location of the entity (such as creator of image or interchange originator) that populates a value in an interchange.

J.1. 59 Lossy compression

Compression where the original (source) image data prior to compression can not be recovered exactly (bit for bit) from the compressed image data.

J.1. 60 Media

Physical method of interchange, e.g. wire, tape, disk, etc.

J.1. 61 Message

A block of information sent from a source to one or more destinations. It is the information which makes up an interchange per EDIFACT (ISO/IEC 9735).

J.1. 62 Object

A collection of structured fields whose content may contain one or more data elements of a particular data type. An object may be assigned a name which may be used to reference the object. Examples of objects are text, image, graphics, and voice.

J.1. 63 ODA

Acronym for Office Document Architecture. ODA is an international standard which provides for the interchange of documents by means of data communications or by the exchange of storage media. Reference: Information Processing - Text and Office Systems - Office Document Architecture (ODA), and Interchange Format Standard, ISO 8613-1.

J.1. 64 Orientation

Indication of how an image was scanned at capture time (i.e. in what direction with respect to normal viewing orientation). The orientation data relates the scan lines to the visual top, bottom, left, and right edges of the document. This information is required in order to have the image correctly oriented for normal viewing upon display (the image may have to be rotated, mirrored, etc. prior to display so it is presented correctly for viewing). See also *image raster data*.

X9.46-1997**J.1. 45 Image processing**

Includes all image input, output, enhancement, and transformation operations performed on images.

J.1. 46 Integrity

1. *Integrity policy* - is a security policy to prevent unauthorized users from modifying, viz., writing, sensitive information.

2. *Data Integrity* - is a means of protecting the data against unauthorized modification.

NOTE - Integrity is normally referred to in terms of data integrity or integrity policy.

J.1. 47 Interchange

The data structure of a financial document, or data, to be transferred between institutions.

J.1. 48 Interchange protocol

A set of standardized rules, and structures, used to interchange information. This may be as complicated as a set of data communication messages, or as simple as a series of phone calls, and carbon-copy, delivery receipts. It may include interchange layout, transmission error detection and correction, authentication, and data protection (encryption), etc.

J.1. 49 Interchange structure

The arrangement or layout of data in an electronic medium for purposes of effecting an exchange of commercial transaction information.

NOTE - May include such things as header, trailer, wrappers, objects, pointers, indices, and overhead items.

J.1. 50 Interchange format

Same as FIIS syntax.

J.1. 51 Interoperate

To exchange data (or information) successfully, to interpret and to act upon that data correctly and present it to the user application.

J.1. 52 Item

An item is the physical representation of a financial transaction. Examples include checks and related paper objects such as deposit slips and cash in/out tickets. The monetary amounts of items, as expressed thereon, will be posted in total, or in detail, as a debit or credit to some account in the bank. Items are generally referred to by their type, as for instance, cash items, transit items, on us items, clearing items, general ledger items, etc.

J.1. 53 Item views

Item views refers to a group of views which represent a single physical item. The views associated with the imaged item may be a frontal, rear, cropped, clipped, compressed, un-compressed, etc., representation of the imaged item.

J.1. 54 ITU-T

International Telecommunication Union- Telecommunications Sector, is a United Nations organization that develops recommendations in the area of telecommunications.

J.1. 37 Gray-scale

A measure of the number of levels of light intensity captured from each pixel within an image. Gray-scale levels resolved with today's photo detectors range from 4 to 256 levels. The greater the number of gray levels captured and retained, the more data that has to be stored and/or communicated (i.e. a one-bit per pixel scanner records only black or white, a two-bit-per-pixel scanner records 4 levels of gray, and a four-bit-per-pixel scanner records 16 levels of gray.)

J.1. 38 Group 4 (T.6)

Two common facsimile (FAX) compression/decompression algorithms defined by the CCITT's Study Group 8 technical committee are Group 3 defined in Rec. T.4, and Group 4 defined in CCITT Rec. T.6. These algorithms typically reduce the size of a normal office document by a factor of 10:1 (CCITT Rec. T.4) and 20:1 (CCITT Rec. T.6). Group 4 algorithms only work on bitonal (black and white) images, not color or gray-scale images.

J.1. 39 Huffman coding

Data compression technique that assigns shorter bit sequences to frequently occurring symbols and longer bit sequences to less frequent symbols.

J.1. 40 Image object content architecture (IOCA)

The term Image Object Content Architecture (IOCA) identifies IBM Corporation's content architecture which provides a method for describing images and image attributes.

J.1. 41 Image (digital image)

A digital representation of all or part of a physical item, including any associated parameters required to interpret the digital representation. The digital representation is created by sensing light reflected from the item.

J.1. 42 Image capture

The operation of converting a human-readable image on paper to a digital representation stored in memory, or some other electronic, or optical, or electromagnetic, surfaced storage media. This is normally accomplished using some type of scanning device or camera.

J.1. 43 Image key

A unique value that unambiguously relates an instance of financial data (used by forward presentment applications) with its corresponding image or view(s). For the purposes of supporting pan-institution query services, an image key shared among institutions should at least be composed of the capture institution's name (i.e., identifier), the capture date, and a unique locally determined naming value that distinguishes each view of an imaged item.

NOTE - The internal policies employed for naming an imaged item, and associating it with its corresponding financial data, are outside of the scope of this standard, but externally, all imaged items should employ the naming convention cited in this clause.

J.1. 44 Image raster data

Description of a rectangular, or square, array formed by a number of horizontal scan lines, comprising a number of picture elements. The picture elements form vertical rows. The number of scan lines establishes the vertical dimension of the array. The number of vertical rows of pixels (equivalent to the number of picture elements per scan line) establishes the horizontal dimension of the array. The relation of scan lines to the physical object represented is referred to as the image's "orientation".

X9.46-1997**J.1. 27 Envelope**

A bounding of a document, pages, or objects which encloses the components in the message data stream.

J.1. 28 Facsimile

A representation of an original item which may differ in appearance from the original in one or more points of comparison (see "copy").

J.1. 29 FII (Financial Image Interchange)

See edi.

J.1. 30 FII-system-user

Financial application, such as one that is engaged in the exchange of financial image interchange, that uses FIIS, in particular FII-translator, to communicate with another financial application.

J.1. 31 FIIS (Financial Image Interchange System)

Financial Image Interchange System is the means by which FII-system-users communicate with each other. X9.46 specifies the FIIS syntax for exchange of FIIs.

J.1. 32 FII-translator

FII-translator is the means by which the FII-system-user interacts with the FIIS by providing operations invocable by the FII-system-user. FII-translator assists the financial applications in originating and receiving interchanges through these invocations. FII-translators interact with each other via a communication mechanism.

J.1. 33 Financial data

Data used to record financial transactions and upon which settlements are made.

J.1. 34 FIIP

Financial Image Interchange Protocol is the FIIS syntax defined in X9.46.

J.1. 35 Financial institution

Any institution that participates in a financial transaction process involving the qualification, disbursement, or exception handling of check transactions, or other financial instruments that represent money or financial obligations.

An organization that engages in financial operations (Oxford dictionary).

J.1. 36 Gray code

A coding scheme named after the inventor (i.e., Mr. Gray). The conversion from a decimal number to a binary number is reordered, such that only one bit changes when the corresponding decimal value is incremented, or decremented.

J.1. 18 Cropping (Windowing)

The process of masking (hiding) those parts of an image that are outside of a defined boundary, such as a viewing window. It is also referred to as trimming. Pixels outside the defined boundary (i.e., the viewing window) are not displayed. The result of the process is the creation a new "reduced" view. The original view remains un-touched.

J.1. 19 Data stream

A continuous stream of data that has a defined format. An example of a defined format is a transaction set.

J.1. 20 Decompression

The process of restoring compressed data to its original form;. essentially the inverse operation to compression. Decompression may be lossy or lossless.

J.1. 21 Default

A value as defined in this standard for a given protocol data element (or sub-element) whose semantics are understood even if an actual value has been omitted from a segment in an interchange .

J.1. 22 Dots per inch (DPI)

"Dpi" is the unit of measure of spatial resolution of image raster data. A 200 dpi image is one which consists of 200 pixels (picture elements) per linear inch horizontally and 200 pixels per linear inch vertically.

J.1. 23 Electronic check exchange (ECE)

The exchange of check information electronically, in lieu of, or in addition to, the exchange of paper checks. For forward presentment, usually referred to as electronic check presentment (ECP). In the context of FII, it identifies the structure of the financial data identified in this standard, e.g., financial data formatted per X9.37 or ECCHO.

J.1. 24 ECE institution

The financial institution that creates electronic check exchange information for exchange with other financial institutions or customers.

J.1. 25 edi

To accommodate X12, this standard refrains from using the term "EDI". X12 requires that if the term EDI is used, then all data elements, data segments, transaction sets, and functional groups are defined in X12.22 (i.e., the X12 data dictionary.) Since many of the data elements and data segment definitions specified in this standard are not duplicated in the X12 data dictionary, the term FII or "edi" is used throughout this standard.

J.1. 26 Electronic Data Interchange (EDI)

Acronym for Electronic Data Interchange. EDI has been standardized in North America by the ANSI Accredited Standards Body X12 and at the International level by ISO/IEC TC 154 (EDIFACT). EDI is a method of exchanging information as data, formatted for computer processing, rather than formatted as human-readable documents. In , X12 EDI standards are published as part of the series of US standards named X12.nn. In ISO/IEC the EDIFACT standard is published as ISO/IEC 9735 multi-part standard. EDI syntax being used in this standard is specified in X12.5 and X12.6.

X9.46-1997**J.1. 8 Character string**

Any group of characters acted upon in a computer system as though it were a single unit.

J.1. 9 Check processing data

MICR line information and associated data used in processing paper-based transactions.

J.1. 10 Clipping

Defining a region of interest within a larger image (usually by specifying a "clipping" rectangle or clipped pixel array within the larger image). Pixels outside the clipping rectangle are retained in the image as captured by the image capture device, however, not displayed (or rendered) to the user.

J.1. 11 Compression

- 1) The technique of encoding data to save storage space. Images are compressed before being stored in a database or communicated and decompressed prior to being displayed or printed.
- 2) Conversion of a digital image to a lower number of bits for storage and/or transmission.

J.1. 12 Compression algorithms

Procedures for compressing data sets representing images. There can be many different algorithms for encoding image raster data, although currently the CCITT standard facsimile Group 3, 4 compression algorithms are the most common for black/white document images.

J.1. 13 Communication protocol

A set of conventions or rules involving predetermined sequences of control signals or characters to establish, or break, connection, or exchange data between discrete computer systems, within networks, (between mainframe and remote terminals), or between a computer and a peripheral.

J.1. 14 Confidentiality

The ability to protect against unauthorized access.

NOTE - Confidentiality is normally referred to in terms of data confidentiality.

J.1. 15 Consumer

The CONSUMER ([C]) in this specification, using the FIIS model outlined in annex D, is either the *FII-system-user* for interactions between FII-system-user and FII-translator, or the *FII-translator* for interactions between FII-translator and transfer facility. The notion of CONSUMER is imported from CCITT's X.403 [9]. Abstractly, the term identifies the generic role that an application entity plays in the exchange of interchanges. A CONSUMER consumes services provided by a SUPPLIER. For example, the FII-system-user is a CONSUMER which consumes services supplied by an FII-translator. Likewise, the FII-translator is a CONSUMER which consumes services supplied by the transfer-facility.

J.1. 16 Continuous tone

Image that contains a varying levels of gray densities between black and white.

J.1. 17 Copy

An exact representation of an original item (see "facsimile").

Annex J
(informative)

Glossary of useful terms

The following explanations are not necessarily definitions in the strict sense. The terms have, depending on the source, varying levels of abstractions and may differ from standard dictionary definitions. When encountered in this standard, the definitions contained in this glossary apply.

J.1.1 Adaptive bilevel image compression (ABIC)

ABIC (Adaptive Bilevel Image Compression) is a lossless compression algorithm that is currently used with the IBM HPTS (High Performance Transaction System). ABIC is a bilevel algorithm that can be used to compress gray-scale images through bit plane processing. Typically, it is used to compress binary images and limited gray-scale images up to 16 levels (4 bits) per pixel.

J.1.2 Authentication

The ability to protect against unauthorized access to a system or service. Authentication is normally classified as either strong or simple authentication. There are several methods of authentication that are normally discussed: One Way Authentication, Two Way Authentication, and Three Way Authentication. All mechanisms involve a method of authenticating that the entity engaging an application is who it claims to be. An example of simple authentication is using a password at binding time. For additional information refer to ISO/IEC 9594-8.

NOTE - Authentication is normally referred to in terms of peer-entity authentication.

J.1.3 Bitonal

Having picture elements (pixels) expressed in only 1 bit. A bitonal view has two intensity values (0 and 1) which represent white and black. For example an octet representing bitonal images would represent 8 pixels because each bit in the octet represents a single pixel.

J.1.4 Byte (Octet)

A unit of data expressed in eight bits.

J.1.5 CCITT (Consultative committee for international telephony and telegraphy)

One of four permanent committees of the International Telecommunications Union (ITU). The CCITT creates recommendations. The ITU is a treaty organization whose members are countries.

In March 1994, the name CCITT was changed to ITU Telecommunications Standardization Sector (ITU-T).

NOTE - All ITU recommendations issued (and technical committees) subsequent to March 1994 bear the name ITU-T, not CCITT.

J.1.6 Character repertoire

See *character set* definition.

J.1.7 Character set

Alphabetic, numeric, punctuation, and special symbols that compose an alphabet for a language. This is also known as a character repertoire.

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1.2 Usage of delimiters in Interchanges

EDI interchanges use a type-less grammar for assembling the interchange. In other words, the components are positionally dependent, and use header identifiers to identify the start of data structures, and separator characters to indicate the end of data structures, or to delineate data elements, and subelements. The following example illustrates, by employing BNF notation, the use of header identifiers and delimiters in a FI1 that contains a Financial Data functional group:

<inter_header> ::= ISA <gs>

•
•
header specific data elements
delimited by <gs>

•
•
<tr>

<financial_data_fg> ::= GS <gs>

•
•
<tr>

<inter_trailer> ::= IEA <gs>

•
trailer specific data elements
delimited by <gs>

•
<tr>

NOTE - In the above example, the ISA is the (ASC-X12) 3 character code that identifies a start of interchange structure, and an IEA identifies an end of a trailer structure. More detailed definitions, for all the identifiers, are contained in this clause and annex A of this specification.

DATA RELATIONSHIP**INTERCHANGE CONTAINING QUERY**

Query Request FG-1 - Start
 [X12 Data Integrity and Protection Security - Start]
 [X9 Authentication Security]
 Digital Signature for entire transaction set
 Digital Signature
 [X9 Authentication for Cash Letter #1 - End]
 Query Search or Read Requestor #1 TS-1 - Start
 Digital Signature for entire transaction set
 Digital Signature
 Query search/read #1 - General Fill Extensions
 Query search/read #1 request criteria

 Query search/read #1 request criteria
 Query Search or Read Requestor #1 TS-1 - End
 Query Search or Read Requestor #2 TS-1 - Start

 Query Search or Read Requestor #2 TS-1 - End
 [X12 Data Integrity and Protection Security - End]
 Query Request FG-1 - End
 Query Request FG-2 - Start

 Query Request FG-2 - End
 Query Request FG-n - Start
 .
 .
 Query Request FG-n - End

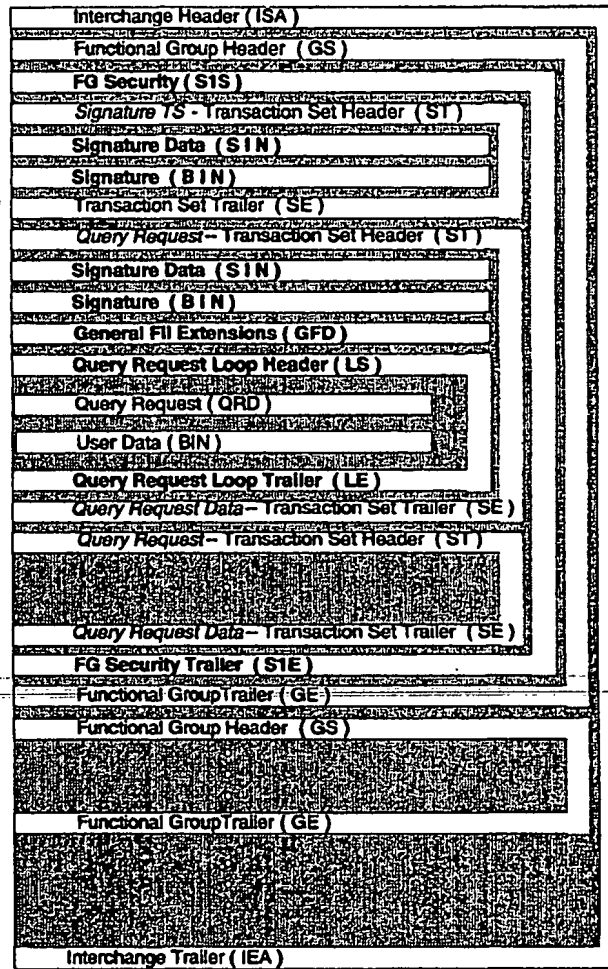


Figure I-4 - Interchange comprising a query request functional group

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DATA RELATIONSHIP

Acknowledgment FG-1 - Start
 [X12 Data Integrity and Protection Security - Start]
 [X9 Authentication Security]
 Digital Signature for entire transaction set
 Digital Signature
 [X9 Authentication for Cash Letter #1 - End]
 Acknowledgment #1 TS-1 - Start
 Digital Signature for entire transaction set
 Digital Signature
 Acknowledgment #1 - General Fill extensions
 Acknowledgment #1 request criteria

 Acknowledgment #K request criteria
 Acknowledgment #1 TS-1 - End
 Acknowledgment #2 TS-1 - Start

 Acknowledgment #2 TS-1 - End
 [X12 Data Integrity and Protection Security - End]
 Acknowledgment FG-1 - End
 FG-2 - Start

 FG-2 - End
 Acknowledgment FG-n - Start
 ⋮
 Acknowledgment FG-n - End

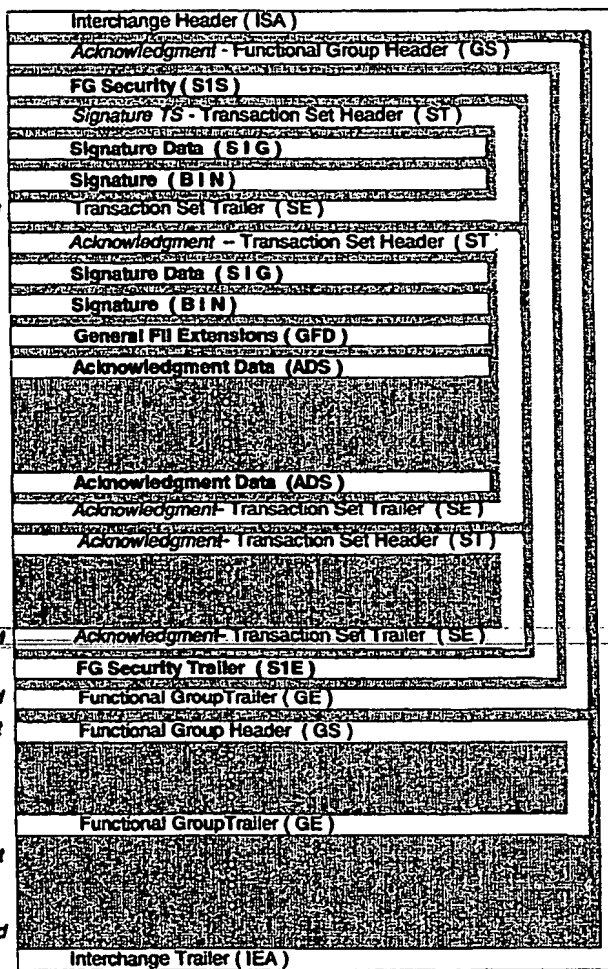
INTERCHANGE CONTAINING
APPLICATION ACKNOWLEDGMENTS


Figure I-3 - Interchange comprising an application acknowledgment functional group

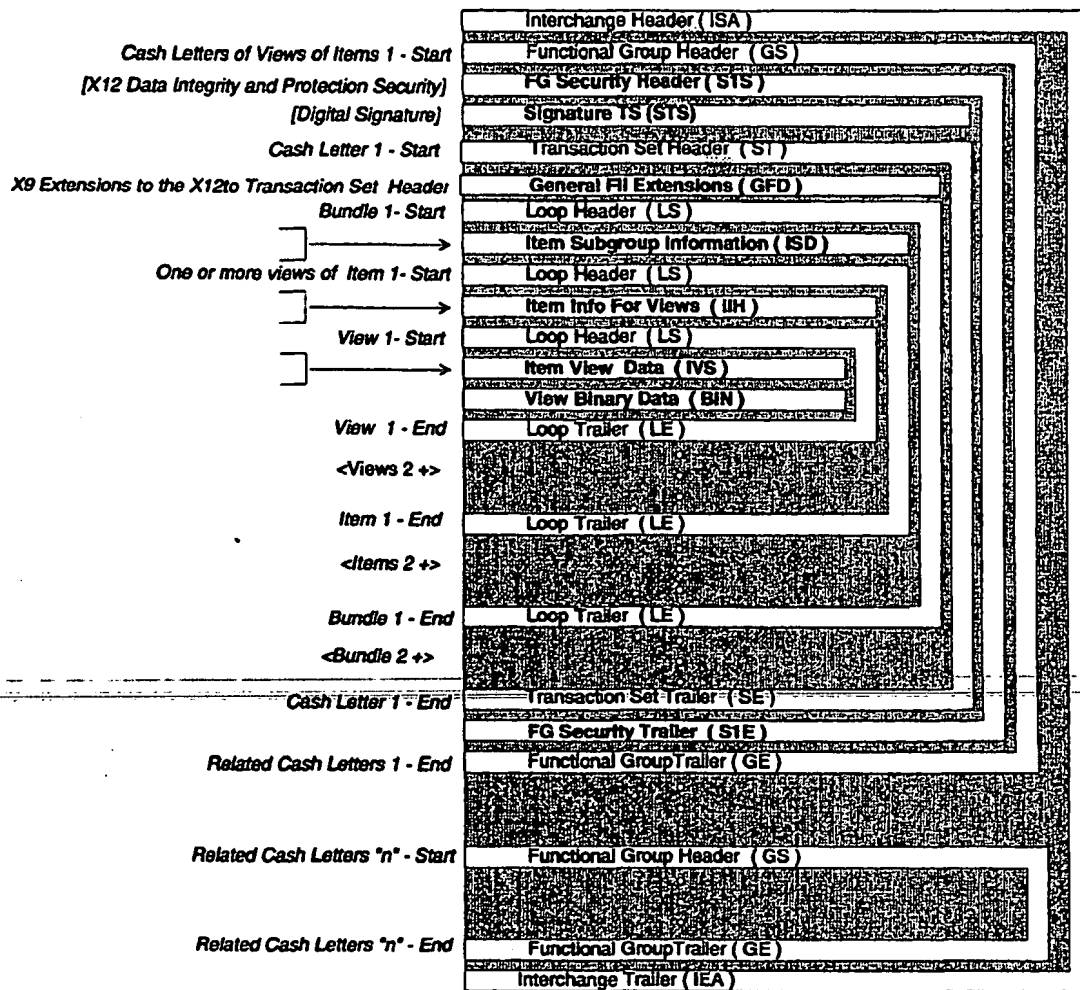
DATA RELATIONSHIP**STRUCTURE**

Figure I-2 - Interchange comprising an item views functional group

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Annex I (informative)

Diagrammatic representations of an FIIS Interchange and delimiter usage

This annex provides a diagrammatic representation of the interchange by functional group. It is intended to offer a visual reference for gaining insights into the interchange structure.

I.1 Diagrammatic representation of the FI.

DATA RELATIONSHIP

INTERCHANGE CONTAINING FINANCIAL DATA

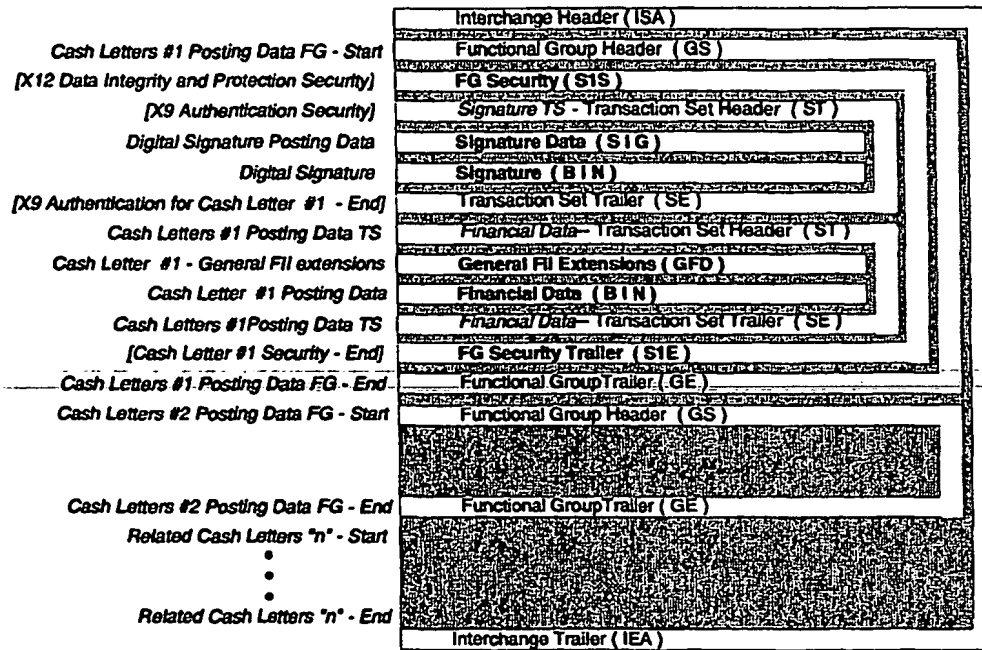


Figure I-1 - Interchange comprising a financial data functional group

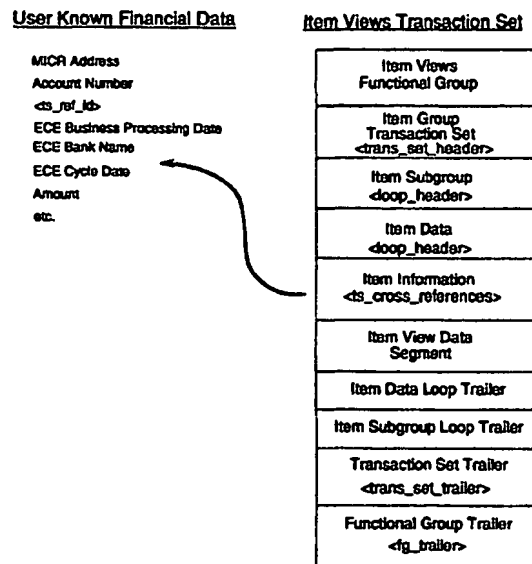


Figure H-2 - Cross-reference views by user to view data segments of interchange

Search and retrieval operations may request views of items by their MICR identifying information or ECE details. The resulting FII transmission indicates the requesting FII cross-reference at the transaction set level. This is illustrated in figure H.3.

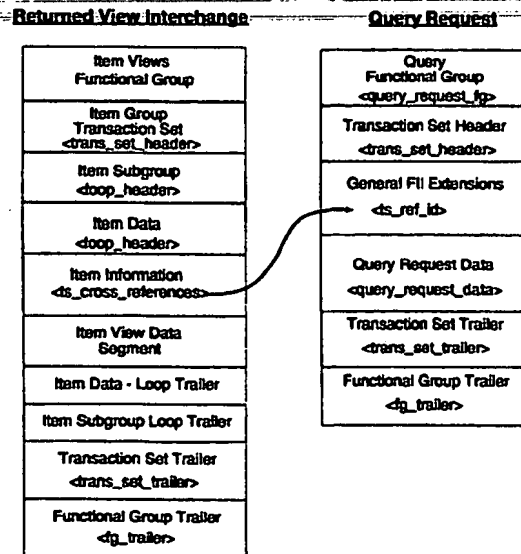


Figure H-3 - Query request response containing cross-references

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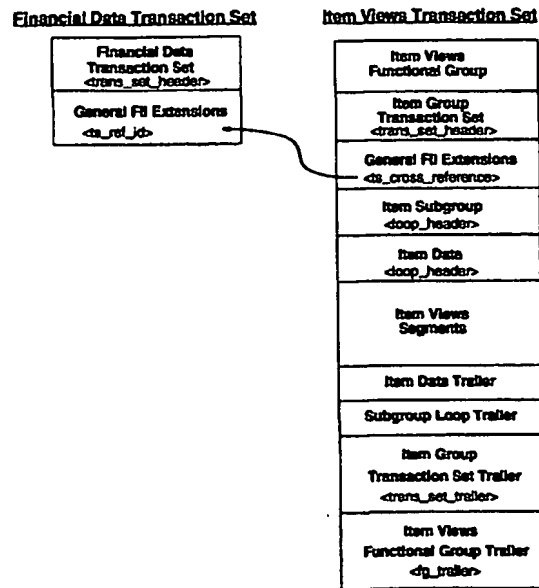


Figure H-1 - Cross-reference views back to financial data transmission interchange

If the Financial Image Interchange is accepted by a receiving FI-system-user, and then repackaged into another interchange that is to be sent off to another user, the resulting transmission is considered a new transmission. Consequently, the cross-reference identifiers are established anew, relevant to the originator of the new transmission.

To enable a FI-system-user to cross-reference a view with financial data that had been received earlier, the FI provides the imaged item's identification information as found in the item's information segment or at the transaction set level. This enables the same information to be associated with multiple views of the same item without redundantly including this information in each view's detail segments. This is illustrated in figure H.2.

Annex H (informative)

Cross referencing overview

This annex provides an overview of the cross referencing mechanism provided by this standard.

FIIS users have a need to cross-reference other information within the FIIL interchange. For example, an EDI financial data item may refer to a view of an item contained in another transaction set of another functional group, or a view of an item may refer to a financial data item contained in a Financial Data transaction set. The mechanisms provided in this standard may be used to satisfy this requirement. The *cross referencing mechanism* corresponds to an FIIL heading field specifically designed to contain cross referencing information. The FIIL-system-user arbitrarily chooses an application cross-reference ID. The FIIL-translator then uses information supplied by the FIIL-system-user to pair this cross-reference ID with a globally unique functional group identifier or transaction set identifier and stores both in the cross-reference in the corresponding functional group or transaction set cross-reference field. The cross referencing services supported in the FIIP are as follows:

- *functional group to functional group;*
- *transaction set to transaction set;*
- *item (view) bundles segment to financial data transaction set;*
- *item view data segment to item segments;*
- *item cash letter to financial data cash letter, when a single financial data cash letter is contained in a single financial data segment;*
- *view details to financial data item (by FIIL-system-user) through the ECE processing information.*

The identifier for a detail segment builds on the identifier for its parent transaction set, or loop segment. The identifier for a transaction set builds on the identifier for its parent functional group. The functional group identifier is composed of the originator's identifier, originator's business date, and a function control number all of which are found in the function header (GS segment). The Functional Group Control Number is unique within that financial image interchange and across all interchanges originated by a sender for a specific functional group date. Its value is determined by the originator of the functional group. The resulting identifier must be globally and forever unique to enable the referenced interchange component to be contained in some other financial image interchange. Identifiers for segments subordinate to a transaction set are created by appending a locally determined numeric to its parent's identifier.

An FIIL-system-user wishing to correlate an item views transaction set or financial data transaction set with an application cross-reference ID found within the EDI interchange uses the application cross-reference identifier to perform a look up in the cross-reference information. It finds the corresponding functional group, transaction set, or detail segment identifier in the data, then can be used to locate, and extract it.

The FIIL-system-user shall supply the FIIL-translator the information required to create the cross-reference information when it requests the FIIL-translator to create the financial image interchange. Similarly, the FIIL-system-user can use the cross-reference data when processing the received financial image interchange.

For informative purposes, only figure H.1 illustrates the mechanism's capabilities. In this example, transaction set 1, a financial data transaction set, is referenced from within the FIIP by a view of a financial item's data segment. This enables the correlation between a particular item in the financial data transmission, either contained in this interchange or in another one. The local reference identifier is "12345".

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Transmission 1:
FI-translator's resulting protocol

Interchange 1 ISA header
[Financial Data] Functional group header
[Financial Data] transaction set header
General FI Extensions <ts_ref_id>
Financial data
Transaction Set Trailer <trans_set_trailer>
Functional Group Trailer <fg_trailer>

Transmission 2:
FI-translator's resulting protocol

Interchange 2 ISA header
[Item Views] Functional group header
[Item Group] transaction set header
General FI Extensions <ts_ref_id> := (<fg_date> " " <app_control_id> " " <function_control_number> " " <trans_set_control_number>) <ts_cross_references>
Item Subgroup <loop_header>
Item Subgroup Information <tsd_ref_id> := (> <ts_ref_id> " " <local_value>)
Item Information <loop_header>
Item Data Information <item_ref_id> := (<tsd_ref_id> " " <local_value>) <
Item View <loop_header>
Item View <item_view_id> := (> <item_ref_id> " " <local_value>)
Item View <loop_trailer>
Item Information <loop_trailer>
Item Subgroup <loop_trailer>
Transaction Set Trailer <trans_set_trailer>
Functional Group Trailer <fg_trailer>

Figure G-2 • Multi-transmission FIS transaction set naming and cross reference use of names

For informative purposes only, figure G.1 illustrates the mechanism's capabilities. In this example, transaction set 1, an Item Views functional group is named by the originating FII-translator using the application <inter_control> identifier that was proposed by the user. The value of <inter_control> as proposed by the user is "1234".

FII-translator's resulting protocol

[Item Views] Functional Group Header
[Item Group] Transaction set header
<ds_ref_id> ::= { <dg_date> <app_sender_id> <function_control_number> <trans_set_control_number>}
General FII Extensions
Item Subgroup Loop
Transaction Set Trailer <trans_set_trailer>
Functional Group Trailer <dg_trailer>

Figure G-1 - FIIS functional group naming

Figure G-2 illustrates the hierarchical internal interchange naming convention used in this Standard and illustrates how it should be employed for cross referencing transaction sets across interchanges. Naturally, the mechanism may be used for cross reference transaction sets within an interchange.

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Annex G (informative)

Interchange structure naming overview

This annex provides an overview of the interchange structure naming mechanism provided by this standard.

FIIS users have a need to correlate members of the interchange and to cross reference information within an interchange and across interchanges. For example, an edifinancial data item is carried in a transaction set which is has child relationship with its parent functional group. This naming convention enables originating and receiving users to:

- Evaluate and resolve transfer rejections by receiving FIIL-translators and users;
- Cross reference financial data transaction sets or functional group with view functional groups, transaction sets, or detail segments all within the same interchange, or across interchanges as described in annex H of this specification;
- Correlate query responses and FIIL acknowledgments with outstanding requests.

The view and financial data, the correlation aspects of provided by the naming scheme support:

- intra-interchange data structure correlation;
- inter-interchange data structure correlation;

The naming scheme employs the following simple concept:

The identifier for a detail structure builds on the identifier for its parent structure. The identifier for the segment immediately subordinate to a transaction set builds on the identifier for its parent. This standard does not define a new identifier for a functional group. However, it requires that the functional group identifier generated by a sender not be duplicated for all the functional groups generated for a specific date. The result of this requirement is that a globally and forever unambiguous identifier can be designed to enable cross referencing across interchanges. This globally unambiguous identifier comprised of the following elements: functional group originated date, application sender identifier, functional group control number, and transaction set control number. Each of these identifiers is contained in the imported X12 structures. This standard requires that the resulting identifier be globally and forever unique to enable cross referencing across interchanges.

To enable the FIIL-translator to appropriately develop a transaction set identifier (<ts_ref_id>), the FIIL-system-user may arbitrarily choose a numerical value and propose it for use to the FIIL-translator. The FIIL-translator then uses this information, supplied by the FIIL-system-user, to populate the appropriate identifiers in the interchange. The value provided by the FIIL-system-user can be used by the FIIL-translator to populate the ISA header's <inter_control> data element. This value can then be used as a root value to populate values in <function_control_number>. Using this scheme the transaction set identifier <ts_ref_id>, which is composed of the <function_control_number>, is associated via this naming thread with the interchange, as it is known to the FIIL-system-user. Locally determined numeric values, i.e., <local_value> suffix used in subordinate structure identifier (e.g., <isd_ref_id>, <item_ref_id>, <item_view_id>), used together with <ts_ref_id> as a root identifier, result with an identifier that has a naming thread to the name as known to the FIIL-system-user, and is globally and forever unique (see figure G-2).

The interchange of data may be initiated either by routine financial processing procedures, or in response to a query.

Understanding that there are different types of data required for a normal financial process, the FIIP Interchange specified herein has been designed to handle the interchange of several types of information:

- a. *financial data as defined in X9.37 and other financial groups;*
- b. *item view data (which contains digitized imaging data, the details required to interpret the image encoding information, and financial control data elements);*
- c. *an acknowledgment structure to indicate acceptance of responsibility for an FI and its components, or to advise of partial results for a query request;*
- d. *a query request for images of one or more financial documents (e.g. that match some selection criteria);*
- e. *a means for canceling an outstanding query request.*

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this specification. The services provided by the FI-translator to the FI-system-user are illustrated in figure F.2. As illustrated, the FIIP interchange may contain multiple views of an image-item, or acknowledgments, financial data, or query request(s) for retrieval of one or more images of items that are believed to be held at an institution.

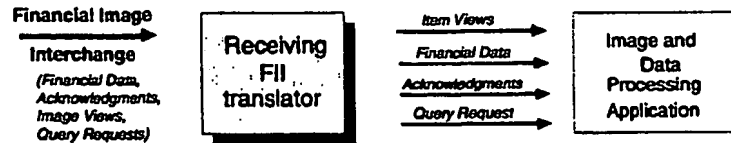


Figure F.2 - FI-translator reception services

F.2 FI system model overview

This document defines an open standard for exchange of financial data, or imaged financial objects, or both, across a heterogeneous computing environment. It defines a simple structure, conforming to the X12 EDI architecture, to specify an EDI interchange which is tailored to support the exchange of digitized images of financial items.

A model of the Financial Image Interchange System (FIIS) is used to illustrate the level of interchange this standard describes. This model is used only as an aid in explaining the use of this Standard and in providing a point of reference. It is not intended to be an actual implementation. As illustrated in figure F.3, financial image interchange occurs within this FIIS. This concept is explained further in annex E.

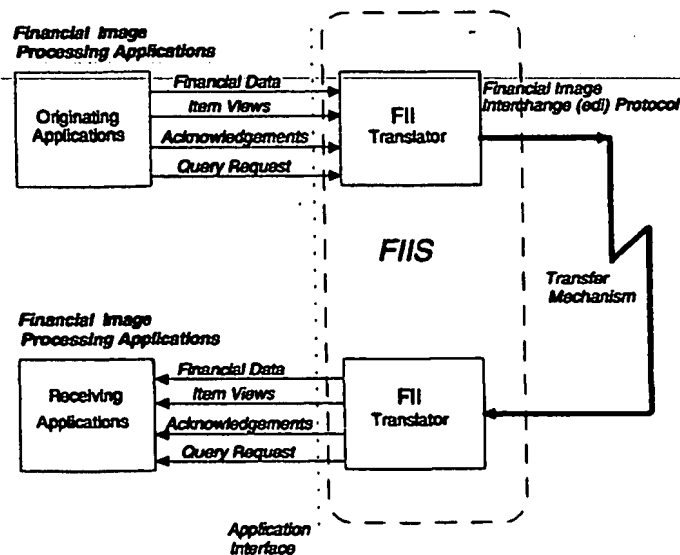


Figure F.3 - The financial image interchange system model

The Financial Image Interchange (FI) fully utilizes X12's EDI standard as a foundation. As with X12, the protocol that is exchanged between two FI-translators is comprised of an interchange header and trailer segment that surrounds one or more defined functional groups. The structures used in this protocol are defined in clause 6.

NOTE - X12's data segment definitions and data element dictionary are greatly extended by this standard. Furthermore, this standard defines a confirmed *edi* service that also supports a query service.

Annex F (informative)

System overview and model

This annex forms a non-integral part of the standard to elaborate further upon the model used in FII.

This annex specifies the system overview and modeling concepts used in this standard. The model uses an originator / recipient concept where both the originator and recipient are applications engaged in FII. The events of FII are activated by either human activities, such as customer relations, or check processing. The overview and model, when read in conjunction with the FII Environment, annex E of this Standard provide the reader with an abstract of the interaction standardized for FII.

F.1 Functional and system overview

The Financial Image Interchange Protocol (FIIP), defined in this specification, specifies an open system format protocol for the exchange of images of financial information across heterogeneous computing systems operating in financial institutions. The FIIP is provided by the FIIS which is modeled as an end-to-end, peer-to-peer application formatting protocol. The FII-translator assists financial computer applications in forming and receiving financial data or requests for financial image sets or the image sets themselves packaged in accordance with the protocol specified in this specification.

Although this Standard does not require implementing a full FIIS environment, it is provided for completeness.

F.1.1 Origination services

The originator of an FIIP conformant interchange shall originate interchanges in accordance with this Standard. The interaction between the image capture and pre-processing application (the FII-system-user) and the FII-translator is not specified in this Standard, although the external design of what is to be exchanged is found in the abstract service definition, annex E of this specification. The services provided by the FII-translator to the FII-system-user are illustrated in figure F.1. As illustrated in this Figure, the image/data capture system may present multiple views of a single image-object-item. The FII-translator can originate financial information objects, such as *forward presentment*, *return notifications*, and *receiver acknowledgments*, or images of truncated financial documents such as *checks*, or *requests* for imaged objects.

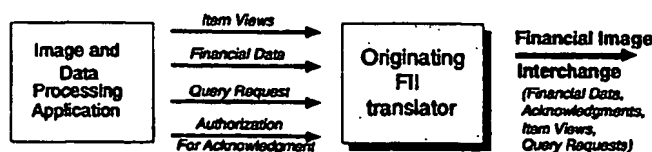


Figure F.1 - FII-translator origination services

F.1.2 Reception services

The receiver of a FIIP conformant interchange shall accept financial image interchanges in accordance with this specification. The interaction between the receiving FII-translator and the image rendering or interchange processing application (the FII-system-user) is not specified in this standard, although the external design of what is to be exchanged is found in the abstract service definition found in annex E of

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E.3.2 Transfer mechanism

The FIIS does not specify which transfer or storage media mechanism is to be used by financial institutions to move a financial image interchange between financial institutions. It simply requires that some mechanism exist between trading partners. Examples of said mechanisms include X.400, FTAM, corporate proprietary communications protocols, formatted tape or optical disks, or any other media deemed appropriate between communicating peers.

Also, the communications of an interchange is an end-to-end service which may involve the use of intermediate relay points. Intermediate FI-translators forward received transaction sets destined to other users by embedding them in a newly constructed interchange.

The security aspects of the FIIS and the transfer mechanism are a matter of the user financial institution's security policy. Together, the transfer mechanism and the FI are envisaged to meet adequately and appropriately, the security expectations of that policy.

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NOTE - The recipient identifier may be specified as a DUNS number or an ABA assigned Routing and Transit Number.

E.2.4.2 FIIS receive interchange abstract operation

The *FIIS-system-user application* assists the Financial Institution's image and data processing application in receiving an interchange through the invocation of the *ReceiveInterchange* abstract operation. The interchange may contain FI functional group(s) as defined in 6.2.1.

The syntax of *ReceiveInterchange* abstract operation is as follows:

```
receive_interchange ::= ABSTRACT-OPERATION
  ARGUMENT SET {
    financialImageInterchange <fi-structure> }
  RESULT      {} - this operation has no results
  ERRORS      { not-available (1),
                unwilling-to-perform (2) }
```

E.3 Secondary object types

The FIIS can be modeled as comprising lesser objects which interact with one another by means of (additional) ports.

```
fiis-refinement REFINES fiis AS {
  FI-translator RECURRING
    origination [S] VISIBLE
    reception   [S] VISIBLE
  communications-mechanism
    submission  [S] INVISIBLE
    delivery    [S] INVISIBLE }
```

These lesser objects are referred to as secondary objects of the Financial Image Interchange System. They include a single central object (the communications or storage media) and a single peripheral object: the FI-translator. The structure of the FIIS is depicted in figure E-1 above.

NOTE - The communications or format medium is considered to be invisible because it is not defined in this Standard.

E.3.1 FI-translator

The *FI-translator* assists the financial institution's imaging application in originating, and receiving, interchanges through the invocation of the *OriginateInterchange* and *ReceiveInterchange* abstract operations, respectively. The interchange may contain Financial Data functional group(s), Item Views functional group(s), Query Requests functional group(s), Functional Acknowledgment functional group(s), or FI Application Acknowledgment functional group(s) as defined in 6.2.1.

```
FI-translator OBJECT
  PORTS {
    origination [S]
    reception   [S]
    submission  [C]
    delivery    [C] }
```

The FIIS comprises any number of FI-translators.

E.2.3.1 Origination port

The Origination port is the means by which a single user conveys information, used by the FIIL-translator to construct interchanges of FIIL functional groups (financial data, imaged items, query requests, or FIIL acknowledgments) containing information objects of the type defined in 6.2, to the FIIS for transmission to another FIIL-system-user. Through such a port, the user originates a Financial Image Interchange. The abstract operations available at the origination port are defined as:

origination APPLICATION-SERVICE-ELEMENT

CONSUMER INVOKES { OriginateInterchange }
 SUPPLIER INVOKES { OriginateControl }

originate-interchange ::= 1 – numeric
 originate-control ::= 2 – numeric

The FIIS supplies one Origination Port to each user. Originate Control abstract operation is for further study.

E.2.3.2 Reception port

The Reception Port is the means by which FIIS conveys the interchange, which is composed of FIIL functional groups (financial data, imaged items, query requests, or FIIL acknowledgments) containing information objects of the type defined in 6.2, to a single user. Through such a port, the user receives the contents of the interchange. The abstract operations available at the reception port are defined as:

reception APPLICATION-SERVICE-ELEMENT

CONSUMER INVOKES { ReceiveControl }
 SUPPLIER INVOKES { ReceiveInterchange }

receive-interchange ::= 3 – numeric
 receive-control ::= 4 – numeric

The FIIS supplies one Reception Port to each user. Receive Control abstract operation is for further study.

E.2.4 FIIS abstract operations

The FIIS provides two abstract operations through its port: the Originate Interchange and Receive Interchange.

E.2.4.1 FIIS originate interchange abstract operation

The FIIL-system-user application assists the Financial Institution's image and data processing application in originating interchanges by providing the Originate Interchange abstract operation. The interchange may contain FIIL functional group(s) as defined in 6.2.1.

The syntax of Originate Interchange abstract operation is as follows:

OriginateInterchange ::= ABSTRACT-OPERATION

ARGUMENT SEQUENCE {
 financial-image-interchange <fil-structure>,
 interchange-recipient Recipient }
 RESULTS {} – this operation has no results
 ERRORS { not-available (1),
 unwilling-to-perform (2) }

Recipient ::= ASCII (SIZE (35))

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E.2 Composition of financial image interchange system (FIIS)

When the FIIS is refined, it is seen to comprise a single central object, the communications mechanism, and numerous FI-translators. There is one FI-translator for each FI-system-user, and it is the means by which the FI-system-user interacts with the FIIS. The communications mechanism may include a file storage device (e.g., file hand-off), or more elaborate means of electronic communications (e.g., electronic mail, or X.25 packet networks).

When the FI-translator is further refined, as specified in clause of this specification, it is viewed to provide several abstract operations that are invocable by the FI-system-user, i.e., Financial User Institution Imaging Application. This Specification defines two (2) abstract operations: **OriginateInterchange** and **ReceiveInterchange**. These abstract operations form the basis of interaction between the FI-system-user and the FI-translator.

NOTE 1 - The interface between the FI-system-user and the FI-translator is outside the scope of this specification.

NOTE 2 - The Specification of the Communication-mechanism of the FIIS is outside the scope of this specification.

E.2.1 Financial institution user application

A Financial Institution User Application is typically a financial institution's imaging application that engages in the exchange of Financial Image Interchanges. Such an application is referred to by the term "user", or "FI-system-user" in this specification. A user originates, receives, or both originates and receives information objects of the types defined in clause 6 through *ports*. An FI-system-user object is defined as follows:

```

fi-system-user OBJECT
  PORTS {
    origination      [C],
    reception        [C] }

```

E.2.2 Financial image interchange system

A Financial Image Interchange System (FIIS) is the object by which all users communicate a financial image interchange with one another in an FIIE. How FIIP objects are communicated is outside the scope of this specification. As the primary communication object for the FIIE, FIIS supplies the service of interchange origination or reception through *ports*. The FIIS object is defined as follows:

```

fiis OBJECT
  PORTS {
    origination      [S],
    reception        [S] }

```

The FIIE comprises exactly one FIIS.

E.2.3 Primary port types

The primary objects of the FIIS are joined, and interact with one another, by means of ports. These ports, which the FIIS supplies are referred to as the primary ports of The Financial Image Interchange System. They are of the types defined below.

NOTE - How an FI-translator concretely realizes the primary ports it supplies is beyond the scope of this specification.

Annex E (informative)

Financial image interchange environment

This annex describes the Financial Image Interchange environment. It provides useful modeling³ information on the services that should be provided by the FI-translator to its client edi and image handling applications. It also sets forth a basis for developing an open application program interface (API). This annex is designed to complement and further elaborate upon annex F's FI System Overview and Model.

E.1 The financial image interchange environment

The Financial Image Interchange Protocol (FIIP) is used to convey financial image interchanges among financial institutions that form the Financial Image Interchange Environment (FIIIE).

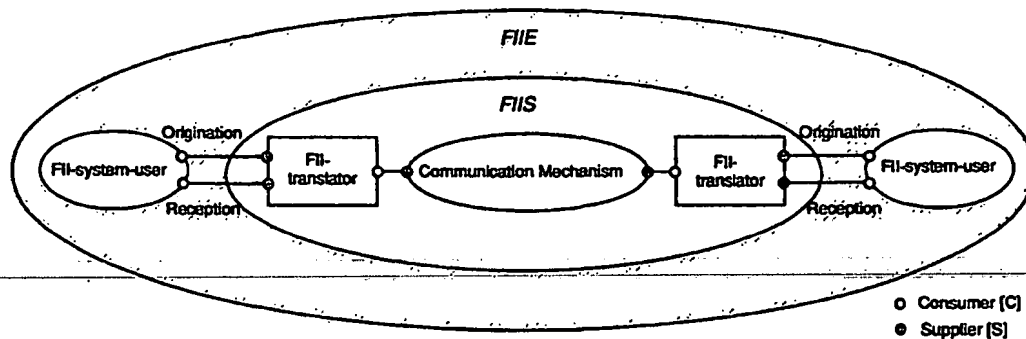


Figure E-1 - FI modeling environment

The environment in which FIIIE takes place can be modeled as an abstract object which hereafter is referred to as the Financial Image Interchange Environment (fiie). When refined (i.e., functional decomposition has been performed), the FIIIE can be seen to comprise lesser objects which interact by means of ports.

```
file-refinement REFINE fiie AS
  fiis
    origination [S] PAIRED WITH fi-system-user
    reception [S] PAIRED WITH fi-system-user
  fi-system-user RECURRING
```

The lesser objects are referred to as the primary objects of the Financial Image Interchange System (FIIS). They include a single, central object, i.e., the FIIS, and numerous peripheral objects called the Financial Institution Imaging Application (FI-system-user). The structure of the FIIIE is depicted in figure E-1.

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<functional_group_ack_code>	M	M	01/01	AK901		
<no_of_included_sets>	M	M	01/06	AK902		
<no_of_received_sets>	M	M	01/06	AK903		
<no_of_accepted_sets>	M	M	01/06	AK904		
<fg_syntax_er_cd>	O	B	01/03	AK905		
<fg_syntax_er_cd>	O	B	01/03	AK906		
<fg_syntax_er_cd>	O	B	01/03	AK907		
<fg_syntax_er_cd>	O	B	01/03	AK908		
<fg_syntax_er_cd>	O	B	01/03	AK909		
<trans_set_trailer>	M	M	—	SE		
<fg_trailer>	M	M	—	GE		

1 - max 999,999 loop iterations.

AK2: Transaction set response loop element names	Protocol Support (M/O/C)	Business Support (M/B _n)	Size	Reference in FII Std	Implemented (Y/N)	Remarks
<trans_set_response_loop>	M	M	—	AK2		
<trans_set_response_header>	M	M	—	AK2		
<trans_set_id>	M	M	03/03	AK201		
<trans_set_control_number>	M	M	04/09	AK202		
<data_segment_response_loop>	O ^{1 2}	C	—	—		
<data_segment_note>	M	M	—	AK3		
<segment_id_code>	M	M	02/03	AK301		
<seg_position_in_trans_set>	M	M	01/06	AK302		
<loop_id_code>	O	B	01/04	AK303		
<segment_syntax_er_cd>	O	B	01/03	AK304		
<segment_syntax_er_cd>	O	B	01/03	AK305		
<segment_syntax_er_cd>	O	B	01/03	AK306		
<segment_syntax_er_cd>	O	B	01/03	AK307		
<segment_syntax_er_cd>	O	B	01/03	AK308		
<data_element_note> ³	O	B	—	AK4		
<el_position_in_segment>	M	M	01/02	AK401		
<data_element_ref_no>	O	B	01/04	AK402		
<element_syntax_er_cd>	M	M	01/03	AK403		
<value_of_bad_element>	O	B	01/99	AK404		
<trans_set_response_trailer>	M	M	—	AK5		
<trans_set_ack_code>	M	M	01/01	AK501		
<trans_set_syntax_error_code>	O	B	01/03	AK502		
<trans_set_syntax_error_code>	O	B	01/03	AK503		
<trans_set_syntax_error_code>	O	B	01/03	AK504		
<trans_set_syntax_error_code>	O	B	01/03	AK505		
<trans_set_syntax_error_code>	O	B	01/03	AK506		

1 - max 999,999 loop iterations.

2 - When present, first occurrence is mandatory, additional ones optional

3 - max 99 instances

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Table D.1 (completed)

Element names for QTS: Query request transaction set (continued)	Protocol Support (M/O/C)	Business Support (M/B/N)	Size	Reference in FFI Std	Implemented (Y/N)	Remarks
<ece_cycle_number_range>	C13	B35	-	6.4.4.3.22		
<ece_cycle_number_start>	O	B17	01/02	6.4.4.3.22.1		
<ece_cycle_number_end>	O	B17	01/02	6.4.4.3.22.2		
<amount_range>	C13	B35	-	6.4.4.3.23		
<item_amount_start>	O	B17	01/12	6.4.4.3.23.1		
<item_amount_end>	O	B17	01/12	6.4.4.3.23.2		
<account_number_range>	C13	B35	-	6.4.4.3.24		
<account_number_start>	O	B17	01/18	6.4.4.3.24.1		
<account_number_end>	O	B17	01/18	6.4.4.3.24.2		
<ece_serial_number_range>	C13	B35	-	6.4.4.3.25		
<check_serial_number_start>	O	B17	01/10	6.4.4.3.25.1		
<check_serial_number_end>	O	B17	01/10	6.4.4.3.25.2		
<private_locator_range>	C13	B35/B1	-	6.4.4.3.26		
<private_locator_id_start>	O	B17	01/80	6.4.4.3.26.1		
<private_locator_id_end>	O	B17	01/80	6.4.4.3.26.2		
<restart_point_indicator>	C16	B10	01/N	6.4.4.3.27		
<search_user_data_present_indicator>	O	B1	01/01	6.4.4.3.28		
<user_data>	O	-	-	-		
<bin_segment> [BIN]	C8	B9	V			
<loop_trailer> [LE (1)]	C8	B9	V			
<ts_security_trailer> [S2E]	C1	B48	V	6.3.1.10		
<trans_set_trailer> [SE]	M	M	V	6.3.1.4		

FA: Functional acknowledgment element names	Protocol Support (M/O/C)	Business Support (M/B/N)	Size	Reference in FFI Std	Implemented (Y/N)	Remarks
<functional_ack_fg>	—	—	—	FA		
<fg_header>	M	M	—	GS		
<functional_transaction_set>	M	M	—	997		
<fg_trailer>	M	M	—	GE		

FA: Functional acknowledgment element names (which contains a 997 transaction set)	Protocol Support (M/O/C)	Business Support (M/B/N)	Size	Reference in FFI Std	Implemented (Y/N)	Remarks
<functional_ack_fg>	—	—	—	FA		
<fg_header>	M	M	—	GS		
<functional_transaction_set>	—	—	—			
<trans_set_header>	M	M	—	ST		
<fg_response_header>	M	M	—	AK1		
<functional_group_id>	M	M	02/02	AK101		
<function_control_number>	M	M	01/09	AK102		
<trans_set_response_loop>	O ¹	C	—			
<fg_response_trailer>	M	M	—	AK9		

Table D.1 (continued)

Element names for QTS: Query request transaction set	Protocol Support (M/O/C)	Business Support (M/B _N)	Size	Reference in FII Std	Implemented (Y/N)	Remarks
<query_request_ts>	-	-	-			
<trans_set_header> [ST]	M	M	V			
<ts_security_header> [S2S]	O	B9	V			
<signature_data> [SIG]	O	B48	V			
<security_orig_name>	M	M	04/16			
<security_recip_name>	M	M	04/16			
<authent_algorithm_id>	M	M	01/15			
<key_and_or_block_size>	O	B11	01/01			
<length_of_data>	O	B11	01/18			
<signature>	O	-	-	-		
<bin_segment> [BIN]	C8	B9	V			
<general_FII_extensions> [GFD]	M	M	-			
<query_reuest_loop>	O	-	-	-		
<loop_header> [LS (1)]	C8	B9	V			
<query_request_data> [QRD]	M	M	-			
<query_request_type>	M	M	01/02			
<qrd_id>	M	M	18/50			
<subject_ref_id>	C12	B29	22/60			
<retrieval_image_key>	C14	B31	34/V			
<color_indicator>	C8	B20	01/02			
<output_type_requested>	C8	B28	01/01			
<secured_results_request_indicator>	O	B9	02/02			
<scale_size_requested>	C8	B28	01/03			
<response_media>	C8	B28	01/03			
<transport_media_requested>	O	B28	01/02			
<processing_priority>	C8	B29	01/01			
<retain_custody_indication>	C8	B28	01/01			
<obsoletes_query_request_id>	O	B33	34/92			
<max_lapse_time>	O	B34	01/08			
<max_matching_views_reqd>	O	B2	01/08			
<view_side_requested>	C8	B28	01/01			
<view_snippet_region>	O	B32	01/31			
<acceptable_compression_ids>	O	B3	01/V			
<payor_bank_id>	O	B35	09/09			
<ece_business_date_range>	C13	B35	-			
<ece_business_date_start>	O	B17	08/08			
<ece_business_date_end>	O	B17	08/08			
<ece_sequence_number_range>	C13	B35	-			
<ece_seq_number_start>	O	B17	01/15			
<ece_seq_number_end>	O	B17	01/15			

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Element names for Query requests functional group	Protocol Support (M/O/C)	Business Support (M/B _N)	Size	Reference in FFI Std	Implemented (Y/N)	Remarks
<query_requests_fp>	-	-	-	6.4.4		
<fq_header> [GS]	M	M	V	6.3.1.1		
<fq_security> [S1S]	O	B12	V	6.3.1.7		
<signature_ts>	O	B9	V	6.3.1.13.1		
<query_request_ts>	M	M	V	6.4.4.1		
<fq_security_trailer> [S1E]	C1	B48	V	6.3.1.8		
<fq_trailer> [GE]	M	M	V	6.3.1.2		

Table D.1 (continued)

Element names for Application Acknowledgment functional group	Protocol Support (M/O/C)	Business Support (M/B/N)	Size	Reference in FFI Std	Implemented (Y/N)	Remarks
<application_ack_fg>	—	—	—	6.4.3		
<fg_header> [GS]	M	M	V	6.3.1.1		
<fg_security_header> [S1S]	O	B48	V	6.3.1.7		
<signature_ts>	O	B9	V	6.3.1.13.1		
<application_ack_ts>	M	M	V	6.4.3.1		
<fg_security_trailer> [S1E]	C1	B48	V	6.3.1.8		
<fg_trailer> [GE]	M	M	V	6.3.1.2		

Element name for ATS: Acknowledgment transaction set	Protocol Support (M/O/C)	Business Support (M/B/N)	Size	Reference in FFI Std	Implemented (Y/N)	Remarks
<application_ack_ts>	—	—	V	6.4.3.1		
<trans_set_header> [ST]	M	M	V	6.3.1.3		
<ts_security_header> [S2S]	O	B48	V	6.3.1.9		
<signature_data> [SI]	O	B9	V	6.3.1.13.1		
<security_orig_name>	M	M	04/16	6.3.1.7.2		
<security_recip_name>	M	M	04/16	6.3.1.7.3		
<authent_algorithm_id>	M	M	01/15	6.3.1.13.2.1		
<key_and_or_block_size>	O	B11	01/01	6.3.1.13.2.2		
<length_of_data>	O	B11	01/18	6.3.1.13.2.3		
<signature>	-	-	-	-		
<bin_segment> [BIN]	C8	B9	V	6.3.1.11		
<general_FFI_extensions> [GFD]	M	M	V	6.3.2		
<application_ack_data> [ATS]	M	M	-	6.4.3.11		
<ack_created_date_time>	M	M	15/15	6.4.3.1.1		
<ack_reason_code>	M	M	01/01	6.4.3.1.2		
<ack_diagnostic_code>	M	M	01/03	6.4.3.1.3		
<subject_ts_ref_id>	C7	B30	16/42	6.4.3.1.5		
<subject_isd_ref_id>	C7	B30	18/50	6.4.3.1.6		
<subject_item_ref_id>	C7	B30	20/58	6.4.3.1.7		
<subject_item_view_id>	C7	B30	22/66	6.4.3.1.8		
<subject_qrd_id>	C7	B30	18/50	6.4.3.1.9		
<number_items_matching_criteria>	C22	B2	01/06	6.4.3.1.10		
<supplemental_info>	O	B1	01/80	6.4.3.1.11		
<image_keys_matching_criteria>	C22	B2	34/V	6.4.3.1.12		
<restart_point_indication>	C17	B2	01/V	6.4.3.1.13		
<ts_security_trailer> [S2E]	C1	B48	V	6.4.3.1.10		
<trans_set_trailer> [SE]	M	M	V	6.4.3.1.4		

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Table D.1 (continued)

Element name for: Item views detail segments	Protocol Support (M/O/C)	Business Support (M/B/N)	Size	Reference in FI Std	Implemented (Y/N)	Remarks
<item_views>	—	—	—	—		
<loop_header> [LS (3)]	M	M	-	6.3.1.5		
<loop_id>	M	M	01/04	6.3.1.5.1		
<item_view_data> [IVS]	M	M	-	6.4.2.8		
<item_view_id>	O	B1	22/66	6.4.2.8.1		
<view_creation_date>	M	M	08/08	6.4.2.8.2		
<view_compression_algo_id>	M	M	01/03	6.4.2.8.3		
<view_rasterdata_sizein_bytes>	M	M	01/10	6.4.2.8.4		
<view_side_indicator>	O	B2	01/01	6.4.2.8.5		
<pixels_per_line>	M	M	01/08	6.4.2.8.6		
<number_of_lines>	M	M	01/08	6.4.2.8.7		
<resolution_unit>	O	B2	01/01	6.4.2.8.8		
<resolution_along_line>	M	M	01/08	6.4.2.8.9		
<resolution_across_lines>	M	M	01/08	6.4.2.8.10		
<bits_per_pixel>	M	M	01/01	6.4.2.8.11		
<interpret_bitmap>	M	M	01/01	6.4.2.8.12		
<orientation>	O	B2	01/01	6.4.2.8.13		
<snippet_info>	O	B25	-	6.4.2.8.14		
<snippet_name>	C18	B25	01/02	6.4.2.8.14.1		
<snippet_origin>	C19	B25	01/01	6.4.2.8.14.2		
<snippet_offset>	C20	B25	07/27	6.4.2.8.14.3		
<snippet_units_of_measure>	O	B2	01/01	6.4.2.8.14.4		
<clipping_information>	O	B26	01/45	6.4.2.8.15		
<clipping_origin>	O	B26	01/01	6.4.2.8.15.1		
<clipping_offset>	O	B26	04/43	6.4.2.8.15.2		
<embedded_header_info>	O	B1	—	6.4.2.8.16		
<embedded_header_indicator>	M	M	01/03	6.4.2.8.16.1		
<view_raster_data_offset>	M	M	01/08	6.4.2.8.16.2		
<creation_computer>	O	B1	01/32	6.4.2.8.17		
<view_description>	O	B1	01/32	6.4.2.8.18		
<scanner_mfgr_name>	O	B1	01/30	6.4.2.8.19		
<scanner_model_name>	O	B1	01/15	6.4.2.8.20		
<view_capture_software>	O	B1	01/30	6.4.2.8.21		
<view_binary_data>	M	M	-	6.3.1.11		
<binary_segment> [BIN]	M	M	00/V	6.4.2.6		
<loop_trailer> [LE (3)]	M	M	-	6.3.1.6		
<loop_id>	M	M	01/04	6.3.1.6.1		

Table D.1 (continued)

Element name for item subgroup and item data loops	Protocol Support (M/O/C)	Business Support (M/B _r)	Size	Reference in FI Std	Implemented (Y/N)	Remarks
<item_subgroup>	—	—	—			
<loop_header> [LS (1)]	M	M	V	6.3.1.5		
<loop_id>	M	M	01/04	6.3.5.1		
<item_subgroup_information> [ISD]	M	M	V	6.4.2.3		
<item_data_loop_length>	M	M	02/10	6.4.2.3.1		
<isd_ref_id>	M	M	18/50	6.4.2.3.2		
<isd_item_count>	M	M	01/08	6.4.2.3.3		
<isd_subgroup_recipient>	M	M	04/18	6.4.2.3.4		
<isd_cross_references>	M	M	16/257	6.4.2.3.5		
<isd_subgroup_amount>	O	B2	01/16	6.4.2.3.6		
<item_data_loop>	M	M	V	6.4.2.4		
<loop_header> [LS (2)]	M	M	V	6.3.1.5		
<loop_id>	M	M	01/04	6.3.1.5.1		
<signature_data> [SIG]	O	B9	V	6.3.1.13.1		
<signature>	-	-	-	-		
<bin_segment> [BIN]	C8	B9	V	6.3.1.11		
<item_information> [IIH]	M	M	V	6.4.2.5		
<item_views_length>	M	M	01/10	6.4.2.5.3		
<item_ref_id>	O	B1	20/58	6.4.2.5.1		
<compression_indicators>	M	M	01/V	6.4.2.5.2		
<view_count>	M	M	01/08	6.4.2.5.4		
<iih_cross_reference>	O	B23	16/257	6.4.2.5.5		
<item_amount>	O	B2	02/12	6.4.2.5.7		
<payor_bank_routing_number>	O	B24	09/09	6.4.2.5.8		
<image_key>	O	B2	34/34	6.4.2.5.9		
<user_data_present_indicator>	O	B1	01/01	6.4.2.5.11		
<user_data>	O	B1	00/V	6.4.2.6		
<bin_segment> [BIN]	M	M	V	6.3.2.7		
<item_views>	M	M	V	6.4.2.7		
<loop_trailer> [LE (2)]	M	M	V	6.3.1.6		
<loop_id>	M	M	01/04	6.3.1.6.1		
<loop_trailer> [LE (1)]	M	M	V	6.3.1.6		
<loop_id>	M	M	01/04	6.3.1.6.1		

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Table D.1 (continued)

Element name for item views functional group	Protocol Support (M/O/C)	Business Support (M/B _N)	Size	Reference in FI Std	Implemented (Y/N)	Remarks
<item_views_fg>	—	—	V	6.4.2		
<fg_header> [GS]	M	M	V	6.3.1.1		
<fg_security_header> [S1S]	O	B9	V	6.3.1.7		
<signature_ts>	O	B9	V	6.3.1.13.1		
<item_group_ts>	M	M	V	6.4.2.1		
<fg_security_trailer> [S1E]	C1	B9	V	6.3.1.8		
<fg_trailer> [GE]	M	M	V	6.3.1.2		

Element name for ITS: View set message set	Protocol Support (M/O/C)	Business Support (M/B _N)	Size	Reference in FI Std	Implemented (Y/N)	Remarks
<item_group_ts>	—	—	—	6.4.2.1		
<trans_set_header> [ST]	M	M	V	6.3.1.3		
<general_FI_extensions> [GFD]	M	M	V	6.3.2		
<item_subgroup>	M	M	V	6.4.2.2		
<trans_set_trailer> [SE]	M	M	V	6.3.1.4		

Compression Algorithms Support	Protocol Support (M/O/C)	Business Support (M/B _N)	Size	Reference in FI Std	Implemented (Y/N)	Remarks
<view_compression_algo_id>	M	M	01/03	6.4.2.8.3		
1 (uncompressed)	O	-	01/01	-		
2 (T6 facsimile compression)	O	-	01/01	-		
3 (JPEG Baseline)	O	-	01/01	-		
4 (JBIG)	O	-	01/01	-		
5 (ABIC)	O	-	01/01	-		
0,6 - 499 (Reserved for X9)	O	-	01/03	-		
500-999 (reserved for private usage)	O	-	V	-		

Table D.1 (continued)

Element names GFD: General FII Extensions segment	Protocol Support (M/O/C)	Business Support (M/B _n)	Size	Reference in FII Std	Implemented (Y/N)	Remarks
<general_fii_extensions>	—	—	—	6.3.2		
<ts_length>	M	M	02/16	6.3.2.1		
<ts_ref_id>	M	M	16/42	6.3.2.2		
<type_of_ts_data>	C24	B14	01/03	6.3.2.3		
<recipient_ack_request>	O	B12	01/04	6.3.2.4		
<ack_conditions>	O	B12	01/01	6.3.2.4.1		
<type_of_request>	O	B12	01/02	6.3.2.4.2		
<ack_security>	O	B12	01/02	6.3.2.4.3		
<send_acknowledgments_to>	O	B15	04/18	6.3.2.5		
<fii_id_qualifier>	M	M	02/02	6.3.2.5.1		
<fii_ack_recipient_id>	M	M	01/15	6.3.2.5.2		
<ts_cross_references>	O	B13	16/257	6.3.2.6		
<type_of_financial_data>	O	B2	01/02	6.3.2.7		
<count_of_financial_data_items>	C9	B18	01/08	6.3.2.8		
<count_of_imaged_items>	C10	B19	01/08	6.3.2.9		
<item_group_amount>	C10	B2	01/16	6.3.2.10		
<item_group_recipient_id>	C10	B20	04/18	6.3.2.11		
<item_subgroup_count>	C10	B21	01/08	6.3.2.12		

Element names for Financial data functional group	Protocol Support (M/O/C)	Business Support (M/B _n)	Size	Reference in FII Std	Implemented (Y/N)	Remarks
<financial_data_fg>	—	—	V	6.4.1		
<function_header> [GS]	M	M	V	6.3.1.1		
<fg_security> [S1S]	O	B9	V	6.3.1.7		
<signature_ts>	O	B9	V	6.3.1.13.1		
<financial_data_t_set>	M	M	V	6.4.1.1		
<fg_security_trailer> [S1E]	C1	B9	V	6.3.1.8		
<fg_trailer> [GE]	M	M	V	6.3.1.2		

Table D.1 (continued)

Element name for FDT: Financial data transaction set	Protocol Support (M/O/C)	Business Support (M/B _n)	Size	Reference in FII Std	Implemented (Y/N)	Remarks
<financial_data_t_set>	—	—	—	6.4.1.1		
<trans_set_header> [ST]	M	M	V	6.3.1.3		
<general_fii_extensions> [GFD]	M	M	V	6.3.2		
<financial_data>	—	—	—	—		
<bin_segment> [BIN]	M	M	V	6.3.2.7		
<trans_set_trailer> [SE]	M	M	V	6.3.1.4		

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Table D.1 (continued)

Element names for BIN: Binary segment	Protocol Support (M/O/C)	Business Support (M/B _N)	Size	Reference in FI Std	Implemented (Y/N)	Remarks
<bin_segment>	—	—	—	6.3.1.11		
<length_of_binary_data>	M	M	01/15	6.3.1.11.1		
<binary_data>	M	M	01/10 ¹⁵ . 1	6.3.1.11.2		

Table D.1 (continued)

Element names for ST: Transaction set header	Protocol Support (M/O/C)	Business Support (M/B _N)	Size	Reference in FI Std	Implemented (Y/N)	Remarks
<trans_set_header>	-	-	-	6.3.1.3		
<trans_set_id>	M	M	03/03	6.3.1.3.1		
FTS	-	-	-	-		
ITS	-	-	-	-		
ATS	-	-	-	-		
QTS	-	-	-	-		
STS	-	-	-	-		
997	-	-	-	-		
<trans_set_control_number>	M	M	04/09	6.3.1.3.2		

Element names for SE: transaction set trailer	Protocol Support (M/O/C)	Business Support (M/B _N)	Size	Reference in FI Std	Implemented (Y/N)	Remarks
<trans_set_trailer>	-	-	-	6.3.1.4		
<no_of_included_segments>	M	M	01/10	6.3.1.4.1		
<trans_set_control_number>	M	M	04/09	6.3.1.4.2		

Table D.1 (continued)

Data element names for S1E: Functional group security trailer	Protocol Support (M/O/C)	Business Support (M/B _N)	Size	Reference in FFI Std	Implemented (Y/N)	Remarks
<dg_security_trailer>	-	-		6.3.1.8		
<message_auth_code>	M	M	09/09	6.3.1.8.1		

Element names for S2S: Transaction set security	Protocol Support (M/O/C)	Business Support (M/B _N)	Size	Reference in FFI Std	Implemented (Y/N)	Remarks
<ts_security>	—	—	—	6.3.1.9		
<security_S2S>	—	—	—	-		
<security_type>	M	M	02/02	6.3.1.9.1		
<security_orig_name>	M	M	04/16	6.3.1.9.2		
<security_recip_name>	M	M	04/16	6.3.1.9.3		
<authent_key_name>	C1	B9	01/16	6.3.1.9.4		
<authent_serv_code>	C1	B9	01/01	6.3.1.9.5		
<encryption_key_name>	C11	B9	01/16	6.3.1.9.6		
<encryption_serv_code>	C11	B9	01/03	6.3.1.9.7		
<length_of_data>	C11	B9	01/16	6.3.1.9.8		
<initialization_vector>	C11	B9	16/16	6.3.1.9.9		

Element names for S2E: Transaction set security trailer	Protocol Support (M/O/C)	Business Support (M/B _N)	Size	Reference in FFI Std	Implemented (Y/N)	Remarks
<dg_security_trailer>	—	—	—	6.3.1.10		
<message_authentication_code>	M	M	09/09	6.3.1.10.1		

Element names for STS: Signature transaction set	Protocol Support (M/O/C)	Business Support (M/B _N)	Size	Reference in FFI Std	Implemented (Y/N)	Remarks
<signature_ts>	—	—	—	6.3.1.13.1		
<trans_set_header> [ST]	M	M	V	6.3.1.3		
<signature_data> [SIG]	M	M	V	6.3.1.13.2		
<security_orig_name>	M	M	04/16	6.3.1.7.2		
<security_recip_name>	M	M	04/16	6.3.1.7.3		
<authent_algorithm_id>	M	M	01/15	6.3.1.13.2.1		
<key_and_or_block_size>	C11	B11	01/01	6.3.1.13.2.2		
<length_of_data>	O	B11	01/18	6.3.1.13.2.3		
<signature>	—	—	—	—		
<binary_segment> [BIN]	M	M	V	6.3.1.11		
<trans_set_trailer> [SE]	M	M	V	6.3.1.4		

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Table D.1 (continued)

Element names for GS: X12 functional group header	Support (M/O/C)	Business Support (M/B _N)	Size	Reference in FFI Std	Implemented (Y/N)	Remarks
<function_header>	-	-	V	6.3.1.1		
<functional_group_id>	M	M	02/02	6.3.1.1.1		
70 (Financial Data)	-	-	-	6.3.1.1.1		
71 (Item Views)	-	-	-	6.3.1.1.1		
FA (Functional Acks)	-	-	-	6.3.1.1.1		
72 (Application Acks)	-	-	-	6.3.1.1.1		
73 (Query Request)	-	-	-	6.3.1.1.1		
80 - 99 (Private)	-	-	-	6.3.1.1.1		
<app_sender_id>	M	M	02/15	6.3.1.1.2		
<app_receiver_id>	M	M	02/15	6.3.1.1.3		
<fg_date>	M	M	06/06	6.3.1.1.4		
<fg_time>	M	M	04/06	6.3.1.1.5		
<function_control_number>	M	M	01/09	6.3.1.1.6		
<standard>	M	M	01/02	6.3.1.1.7		
<version>	M	M	01/12	6.3.1.1.8		

Element names for GE: Transaction set header	Protocol Support (M/O/C)	Business Support (M/B _N)	Size	Reference in FFI Std	Implemented (Y/N)	Remarks
<fg_trailer>	-	-	-	6.3.1.2		
<no_included_sets>	M	M	01/10	6.3.1.2.1		
<function_control_number>	M	M	04/09	6.3.1.2.2		

Element names for S1S: Functional group security	Protocol Support (M/O/C)	Business Support (M/B _N)	Size	Reference in FFI Std	Implemented (Y/N)	Remarks
<fg_security>	-	-	-	6.3.1.7		
<security_SxS>	-	-	-			
<security_type>	M	M	02/02	6.3.1.7.1		
<security_orig_name>	M	M	04/16	6.3.1.7.2		
<security_recip_name>	M	M	04/16	6.3.1.7.3		
<authent_key_name>	C1	B9	01/16	6.3.1.7.4		
<authent_serv_code>	C1	B9	01/01	6.3.1.7.5		
<encryption_key_name>	C11	B9	01/16	6.3.1.7.6		
<encryption_serv_code>	C11	B9	01/02	6.3.1.7.7		
<length_of_data>	C11	B9	01/18	6.3.1.7.8		
<initialization_vector>	C11	B9	16/16	6.3.1.7.9		

Table D.1 - FIU PICS pro-forma

Element names for FIU structure, including ISA/IEA segments	Protocol Support (M/O/C)	Business Support (M/B _N)	Size	Reference in FIU Std	Implemented (Y/N)	Remarks
<fiu_structure>	-	-	-	6.2.2		
<inter_header> [ISA]	M	M	-	6.2.3		
<authorization>	-	-	-	6.2.3.1		
<authorization_qualifier>	M	M	02/02	6.2.3.1.1		
<authorization_info>	M	M	10/10	6.2.3.1.2		
<security>	-	-	-	6.2.3.2		
<security_qualifier>	M	M	02/02	6.2.3.2.1		
<security_info>	M	M	10/10	6.2.3.2.2		
<sender>	-	-	-	6.2.3.3		
<inter_id_qualifier>	M	M	02/02	6.2.3.3.1		
<sender_id>	M	M	15/15	6.2.3.3.2		
<receiver>	-	-	-	6.2.3.4		
<inter_id_qualifier>	M	M	02/02	6.2.3.4.1		
<receiver_id>	M	M	15/15	6.2.3.4.2		
<inter_date_time>	-	-	-	6.2.3.5		
<inter_date>	M	M	06/06	6.2.3.5.1		
<inter_time>	M	M	04/04	6.2.3.5.2		
<standard_version>	-	-	-	6.2.3.6		
<standards_identifier>	M	M	01/01	6.2.3.6.1		
<version_id>	M	M	05/05	6.2.3.6.2		
<inter_control>	M	M	09/09	6.2.3.7		
<ack_requested>	M	M	01/01	6.2.3.8		
<test_indicator>	M	M	01/01	6.2.3.9		
<subelement_seperator>	M	M	01/01	6.2.3.10		
<financial_data_fg>	O	B4	V	6.4.1		
<item_views_fg>	O	B5	V	6.4.2		
<functional_ack_fg>	O	B6	V	6.3.1.12		
<application_ack_fg>	O	B7	V	6.4.3		
<query_requests_fg>	O	B8	V	6.4.4		
<inter_trailer> [IEA]	M	M	V	6.2.4		
<number_groups>	M	M	01/05	6.2.4.1		
<inter_control>	M	M	09/09	6.2.4.2		

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The columns headed *Implemented* and *Remarks* are intended for use by the user.

- B₂₇ shall be present only if <application_ack_diagnostic_code> indicates that constraints have been exceeded unless explicitly omitted in the Banking Practices Agreement.
- B₂₈ shall be present if the <query_request_type> is other than a cancel request ("0").
- B₂₉ shall be present if the <query_request_type> is cancel request ("0") or restart request ("3").
- B₃₀ shall be present only if specified in BPA, and then shall be subject to the type of acknowledgment requested.
- B₃₁ shall be present if the <query_request_type> is retrieve request ("1").
- B₃₂ shall be present when a snippet is requested.
- B₃₃ shall be present to obsolete an outstanding query request.
- B₃₄ shall be present to override the 300 second default.
- B₃₅ shall be present only to request a generic search on a specific value or range of values.

NOTES -

1. Use of a Default value satisfies a Business Conditional usage requirement.
2. If the Protocol Support column contains an O or C_x, the Business Usage column should be B_x.
3. Data elements composed of subelements whose values are defined to be Optional still must contain the subelement separator, if any subelement value is present. This is further explained in 6.1.6.

The *Size* column shall define the minimum and maximum number of characters (size) of the value for a data element when present. The format is XX/YY where XX is minimum size, and YY is maximum size. Values outside of the range shall be considered protocol violation. If the data element is composed of subelements, the size includes the sub-element separator characters. The data element delimiter (<gs>) and structure delimiter (<tr>) are not included in the size value.

The size for subelement values does not include the subelement separator. However, subelement delimiters are included in the size of the parent data element because subelement separator(s) shall be present in a data element even though the value for the subelement may be absent. For example, when the data element consists of 3 sub-elements, the size value for XX and YY will be determined as the value, plus 2 characters for the 2 sub-element delimiters.

NOTE - The size of a structure is the sum of the following components:

- 1 character for each data element delimiter, plus,
- 1 character for the structure terminator (<tr>), plus,
- 2 or 3 characters for the length of the structure identifier (e.g., "GS" = 2 characters), plus,
- size of the value for the actual data element.

The *Reference* column indicates the clause number in this standard where the element of protocol is defined.

The *Data element names* column are organized by detail segments within transaction sets (i.e., X9's version of Transaction Sets), transaction sets within functional groups, and functional groups within the interchange.

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- B₅ shall be present if views of imaged items are in the interchange.
- B₆ shall be present if a Functional Acknowledgement is conveyed in the interchange.
- B₇ shall be present if an application acknowledgement is conveyed in the interchange.
- B₈ shall be present if a Query Requests Functional Group is present in the interchange.
- B₉ shall be present only to specify or to convey security features or security mechanisms.
- B₁₀ shall be present if the <query_request_type> is restart request ("3").
- B₁₁ shall be present if the data element is required.
- B₁₂ shall be present if an acknowledgement is requested, and the defaults are inappropriate.
- B₁₃ shall be present when responding to query request, may be present for other transaction sets.
- B₁₄ shall be present for transaction sets containing item group, financial data, or query requests.
- B₁₅ shall be present only to redirect an acknowledgement to a recipient other than the sender of this functional group.
-
- B₁₆ shall be present when responding to a Query Request.
- B₁₇ shall be present only to specify a limit for a generic criterion.
- B₁₈ shall be present when <general_fii_extensions> are conveyed in the Financial Data Functional Group.
- B₁₉ shall be present when <general_fii_extensions> are conveyed in the Item Group Transaction Set.
- B₂₀ shall be present only in an Item Group Transaction Set.
- B₂₁ shall be present in Item Views Functional Group unless explicitly omitted in Banking Practices Agreement.
- B₂₂ shall be present to cross reference to financial data, or query requests, if appropriate.
- B₂₃ shall be present when cross referencing to another X9.46 transaction set, unless explicitly omitted by the Banking Practices Agreement.
- B₂₄ shall be present only to supplement the routing number of the financial institution by, or through whom, the item is payable.
- B₂₅ shall be present if necessary to identify properly the snippet.
- B₂₆ shall be present when <clipping_info> are conveyed.

- C₁₃ valid only if the <query_request_type> is search request ("2").
- C₁₄ valid only if the <query_request_type> is retrieve request ("1").
- C₁₅ valid only when <view_side_requested> is frontal view ("0") or rear view ("1").
- C₁₆ valid only if the <query_request_type> is restart request ("3").
- C₁₇ valid only if <application_ack_diagnostic_code> indicates that constraints have been exceeded ("8").
- C₁₈ valid only if snippets are used.
- C₁₉ valid only if both snippet origin and offset are used.
- C₂₀ valid only if snippet origin is used.
- C₂₁ valid for any transaction set, shall be present when responding to a query request.
- C₂₂ valid only when the acknowledgement is in response to a query request other than Query Cancel Request ("0").

The fact that a minimum length is specified for values, does not prevent Optional (or DEFAULTed) values from being entirely absent from an interchange with an actual length of zero. This descriptive convention is used to be consistent with X12 standards.

The *Business Usage* column indicates support required by a financial institution's Business Practices Agreement which is external to this Standard:

This column contains values indicating the support required of business user applications by this standard. Its value expands upon the protocol support as required by the business community. The values shall be one of the following:

- M** *Mandatory: The value(s) for this data structure, data element value, or subelement value shall be present upon origination of the interchange, and shall be handled and made available to the receiving FI-system-user on reception. Business usage is always mandatory when protocol support is mandatory.*
- B_x** *Business Conditional: A value for this data element or subelement is present, or absent, under certain conditions, or as defined in the Banking Practices Agreement. Specific predicates are indicated with numbers (i.e. B_x) defined in the inline text. Use of a Default value satisfies a Business Conditional usage requirement.*

Predicates for business usage conditions (B_x):

- B₁ shall be present only if specified in Banking Practices Agreement.
- B₂ shall be present unless explicitly omitted in the Banking Practices Agreement.
- B₃ shall be present only to override or supplement Banking Practices Agreement.
- B₄ shall be present if financial data is in the interchange.

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O Optional:

On origination, this data structure (functional group, transaction set, data segment), data element, or subelement may be supported by the translator. When supported, it shall have a size and data type as specified

On reception, FI-translator shall support this data structure (functional group, transaction set, data segment), data element, or subelement as follows:

If present, this data structure (functional group, transaction set, data segment), data element, or subelement shall be handled by the receiving FI-translator and shall be made available to the receiving FI-system-user.

If not present, no error will be generated because of the absence of an optional data structure (functional group, transaction set, data segment), data element, or subelement.

NOTE – The fact that a minimum length is specified for values, does not prevent Optional (or DEFAULTed) values from being entirely absent from an interchange with an actual length of zero. This descriptive convention is used to be consistent with X12 standards.

Cx Conditional: *The FI-translator's origination Support for this data structure, data element, or subelement is mandatory under certain conditions, and optional under all other conditions.*

The predicates "x" are indicated with numbers (i.e. Cx) defined as follows:

- C₁** shall be supported if security at the present structural level is supported.
- C₂** Conditional, valid only when the value of <trans_set_id> in the Transaction Set header is Item Group, Financial Data, or Query Request
- C₃** required when cross referencing between transaction sets.
- C₄** each shall be supported, but only one shall be present in acknowledgement.
- C₅** if Query Requests Functional Group is supported, it too shall be supported. However, it shall only be present in a cancel request ("0"), and no other data elements shall be included in the segment.
- C₆** shall be present only if signature data <signature_data> is present.
- C₇** present only if requested to be acknowledged at the this level. If used, either the <subject_ts_ref_id>, <subject_lsd_ref_id>, <subject_item_ref_id>, <subject_item_view_id>, or <subject_qrd_id>, shall be present. The presence of more than one of these shall be considered a protocol violation.

The term **valid** is used in the predicates C₈ - C₂₃ to indicate that the applicability of a specific data element depends on the type of structure and function. It does not dictate the presence of the value in the interchange, and the data element is considered to be optional.

- C₈** valid only if the <query_request_type> is other than a cancel request ("0")
- C₉** valid only in a Financial Data Functional Group
- C₁₀** valid only in a Item Group Transaction Set
- C₁₁** valid only if required by or applicable to the security mechanism utilized.
- C₁₂** valid only if the <query_request_type> is cancel request ("0") or restart request ("3").

Annex D
(informative)

**Financial image interchange protocol pro-forma for a
Protocol Implementation Conformance Statement**

This annex summarizes the EDI interchange layout for the Financial Image Interchange protocol, and provides a pro-forma for users of this standard. In the context of standardization, the pro-forma is referred to as a Protocol Implementation Conformance Statement (PICS-pro-forma). This specific pro-forma is entitled FII PICS pro-forma. The pro-forma may serve many functions for users, for example:

1. *vendors and service providers can use it to identify implementation support for optional aspects of this standard; or*
2. *financial institutions and service providers can use it to indicate required support for procurement from their suppliers; or*
3. *Readers of this standard have a summary of what the Financial Image Interchange protocol entails.*

Table D-1, contained in this annex, may be reproduced freely. All other aspects are covered by ANSI copyright infringement protection associated with this standard's publication.

The *Protocol Support* column indicates support required by this standard:

This column contains values indicating the support required by this standard, and X12, for these entries. Support shall be verified as part of an implementation's conformance evaluation. The values shall be one of the following:

M Mandatory:

On origination, this data structure (functional group, transaction set, data segment), data element's value, or subelement's value, shall be present on origination of the interchange, and shall comply with its defined syntax, e.g., size and data type as specified. An error shall be generated if this data structure (functional group, transaction set, data segment), data element, or subelement, is absent.

On reception of the interchange, this data structure (functional group, transaction set, data segment), data element, or subelement, shall be handled and made available to the receiving FII-system-user. An error shall be generated if this data structure (functional group, transaction set, data segment), data element, or subelement, is absent.

- "Handle" means that the FII-translator will recognize it, correctly parse its syntax, and validate only its size and data type.

- "Make Available" means that the FII-translator will pass the data contents to the FII-system-user.

NOTE 1 - *The mechanism by which an FII-system-user provides the values (of non- translator generated data) to the FII-translator is a local implementation matter.*

NOTE 2 - *An optional data-element may contain optional or mandatory subelements. If a subelement is mandatory it shall be present when the parent data element is present.*

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C.3.10.1. Transcoding considerations

The following considerations should be evaluated if transcoding is used:

- a. *Transcoding of images which have been compressed in one of the lossless compression algorithms will result in no loss of image quality when decompressed for use. Lossless compression algorithms include CCITT-G4, JBIG, and ABIC.*
- b. *Transcoding of images which have been compressed on one of the lossy compression algorithms may result in some degrading of image quality. A single transcoding has been reviewed by the X9B9 committee, and such a transcoding has been shown to be acceptable. That is, the resulting image degradation does not affect adversely the usability of the image. The only lossy compression algorithm supported by X9.46 is the JPEG Baseline compression algorithm. However, JPEG parameters can be set to achieve a nearly lossless quality with larger image sizes. The setting of the JPEG parameters is discussed in the JPEG standard.*
- c. *Since it is possible to interchange images compressed using algorithms not identified in this standard, transcoding raster data compressed with such an algorithm has not been evaluated by X9, and risks associated with these transcodings shall be determined by the party banks.*

Table C-1 - Business usage summary: BPA related conditions

B1 - Shall be present only if specified in BPA	
Element Name	Reference
Creation computer	6.4.2.8.17
View description	6.4.2.8.18
Scanner manufacturer name	6.4.2.8.19
Scanner model name	6.4.2.8.20
View capture software	6.4.2.8.21
Supplementary information	6.4.3.1.11
User data present indicator	6.4.2.5.11
Embedded header information	6.4.2.8.16
Search user data present indicator	6.4.4.3.28

B2 - Shall be present unless explicitly omitted in the Banking Practices Agreement	
Element Name	Reference
User data	6.4.2.6
Type of financial data	6.3.2.7
Item group amount	6.3.2.10
ISD subgroup amount	6.4.2.3.6
Item amount	6.4.2.5.7
Image key	6.4.2.5.9
View side indicator	6.4.2.8.5
Resolution unit	6.4.2.8.8
Orientation	6.4.2.8.13
Snippet unit of measure	6.4.2.8.14.4
Subject transaction set reference identifier	6.4.3.1.5
Subject ISD reference identifier	6.4.3.1.6
Subject item reference identifier	6.4.3.1.7
Subject item view identifier	6.4.3.1.8
Subject QRD identifier	6.4.3.1.9
Number items matching criteria	6.4.3.1.10
Image keys matching criteria	6.4.3.1.12
Restart point indicator	6.4.3.1.13
Maximum matching views requested	6.4.4.3.17

B3 - Shall be present only to override or supplement Banking Practices Agreement	
Element Name	Reference
Acceptable compression identifiers	6.4.4.3.18

C.3.9. Performance issues

This section should specify any performance-related considerations. These include the number of imaged items required to be delivered in N time periods.

C.3.10. Transcoding guidelines

This section should specify the transcoding combinations which will be acceptable to the receiving institutions, establish use of intermediaries, if necessary, and determine any fees related to this process.

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identified. The acceptance of the usage of any non-standard image parameter options should be clearly stipulated.

C.3.4. ASCII or EBCDIC encodings

This section should identify whether ASCII or EBCDIC encoding will be used to represent data in the interchange.

C.3.5. Cross referencing

In this section, parties should specify how extensively they will use cross referencing in interchange, and for what period(s) of time senders and receivers will maintain cross references.

C.3.6. User data

If parties intend to make use of any of the user data elements, the addendum should specify which user data elements will be present in interchanges, and which format(s), and encoding(s), will be used to structure the data.

C.3.7. Private values

Many data elements allow for privately defined values. The technical addendum should state the nature and extent of such usage between interchange partners. This section of the addendum also may be used to define more fully or to attach private meaning to relative data values (e.g., high priority, low priority).

C.3.8. Image requirements

This section should cover details such as acceptable time(s) for retransmission if necessary, definition of controls to limit each interchange to specific functional group types to ensure compliance with procedures defined in the standard, size of image bundles (sub groups), and image cash letters (groups), and acceptable image views (i.e., individual views partial view or snippets, or multiple views, if not covered elsewhere in the Banking Practices Agreement).

C.3.8.1. Explicit protocol element support requirements

The following table identifies informational elements that receivers would expect to receive, unless explicitly omitted in the BPA or Addendum, or would agree in the BPA or Addendum that the sender would provide explicitly. The table also provide cross references to location of description of these elements in the standard.

 By: _____ By: _____
 Title: _____ Title: _____
 Date: _____ Date: _____

C.3. Technical addendum

This section contains technical requirements or issues that participants in exchange should consider for inclusion in an Addendum to the BPA.

C.3.1. Communications method

Prior to performing image interchange, each participant involved in the interchange should agree on the type of communications method to utilize. Normally, a BPA would cover agreements on communications methods between senders, receivers, and intermediate sites. Examples of communications methods include, but are not limited to, the following:

- a. Teleprocessing methods: *Links, network end point addresses, speed, data transfer protocols, etc. should be defined for teleprocessing methods;*
- b. Hard media: *Hard Media requires physical transportation from one site to another. Consideration should be given to the mode of transportation, the delivery time, and the kind of media;*
- c. Contingency planning: *This agreement should address business resumption procedures, or references to business resumption procedures, and should include disaster site information and designated alternative service providers;*
- d. Value added networks: *Value added network specific information for communications.*

C.3.2. Media to be interchanged

When hard media is to be utilized, the type of media should be specified within the BPA. Examples of media type include, but are not limited to, the following types:

- a. Tape
 - 1) 9 Track (6250 or 1600)
 - 2) 3480 Cartridge (18 or 36 track)
 - 3) 1/4" Cartridge
 - 4) DAT
- b. Optical Disk
 - 1) Write Once Read May (WORM)
 - 2) Magneto Optical (MO)
 - 3) Compact Disk (CDROM)

C.3.3. Acceptable compression algorithm and imaging parameter options

This part of the addendum would identify the compression algorithm and imaging parameters which the paying bank is willing to accept as part of the interbank image interchange. It would clearly identify spatial scan densities, gray levels, and description the compression algorithm used (see table in 4.11). All required review elements, which should clearly be available for each view, should be specifically

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attached hereto. Paying bank shall notify presenting bank [within _____ of receipt] if retransmission of an image(s) is necessary because of poor quality or other reasons.

6. Return and notice of nonpayment.

- (a) Upon receipt of an instruction to return from the paying bank by 5:00 p.m. local time of the presenting bank on a business day in accordance with this agreement, the presenting bank shall retrieve the eligible check, add the reason for return, and return the check expeditiously by the presenting bank's midnight deadline. The instruction to return shall contain the following information: _____, an image of the check, and the reason for return, and the instruction shall be considered a notice in lieu of return under Regulation CC, section 229.30(f).

The instruction should include information that permits retrieval of the check, and the parties may also wish to require return of an image received by the paying bank.

- (b) Paying bank warrants to presenting bank that an instruction to return relates to an eligible check, including an eligible check that is payable through paying bank, presented by presenting bank no earlier than the paying bank's banking day next prior to the business day of receipt of the instruction to return by the presenting bank.
- (c) Presenting bank shall give notice of nonpayment to the depository bank in accordance with Regulation CC, section 229.33, for an eligible check in the amount of \$2500. or more. The notice must be received by 4:00 p.m. local time of the depository bank on the business day following the business day of receipt of the paying bank's instruction to return by the presenting bank.

7. Transmission and security.

- (a) The parties shall transmit MICR line data, images, requests, instructions, and other communications in accordance with the technical Addendum attached hereto.

8. Fees.

- (a) The parties agree that the fees [set forth in the Addendum] will apply under this agreement.

9. Liability.

- (a) Each party shall be liable under this agreement only for its own lack of good faith or failure to exercise ordinary care as provided in Regulation CC, section 229.38. Each party shall be liable for breach of warranty under this agreement as provided in Regulation CC, section 229.34.
- (b) The parties agree to adhere to the Rules on Interbank Compensation of the National Council for Uniform Interest Compensation regarding compensation claims not covered by Regulation CC.
- (c) Disputes between the parties shall be submitted to binding arbitration under the rules of the American Arbitration Association. No arbitration proceeding shall be brought under this agreement by a party against the other party more than one calendar year after the cause of action accrues.
- (d) This agreement is a truncation agreement as provided in Regulation CC, section 229.36(c), and an agreement for electronic presentment as provided in the Uniform Commercial Code (1990), section 4-110. This agreement is also an agreement as provided in Regulation CC, section 229.37, and Uniform Commercial Code, section 4-103, and a banking practices agreement as provided in X9.46, Annex C.

10. Termination.

- (a) This agreement may be terminated by written notice by one party to the other effective [five (5)] business days after receipt of the notice, or at a later date specified in the notice. Termination shall not affect a party's obligations under this agreement (including retention, unless otherwise agreed) with respect to eligible checks presented on a day prior to termination day.

Presenting bank: Paying bank:

- [(i) for adjustments of \$_____ or more, on the next business day;
- (ii) for adjustments under \$_____ received less than_____ business days after settlement, within _____ business days; and
- (iii) for adjustments under \$_____ received _____ or more business days after settlement, within _____ business days.]

The parties should agree on procedures for submission and settlement of adjustments.

4. Retention of eligible checks.

- (a) Presenting bank shall retain eligible checks for [sixty (60)] calendar days from the date of presentment, or until returned upon the instruction by the paying bank.

The checks must be available for return upon instruction by the paying bank, and may be needed during the usual customer inquiry period of a statement cycle plus a reasonable time. Local law of each bank should be consulted.

- (b) Presenting bank shall send to paying bank [by _____] an eligible check within _____ of receipt of a proper request, which shall include _____.

5. Retention and availability of images.

- (a) Presenting bank shall retain an image of each eligible check [for a period of [seven (7)] calendar years from the date of presentment, or, if the check is returned by the presenting bank upon instruction by the paying bank, for a period of _____ calendar days from the date of presentment] [until paying bank has acknowledged receipt of the image from presenting bank as provided in section 5(e)].

The parties should determine whether the presenting or the paying bank will perform storage of images. Local law of both parties should be consulted.

- (b) Presenting bank shall transmit to paying bank [a _____ snippet (as defined in X9.46) of] the image of an eligible check:

[(i)] within [one-half hour] of receipt of a proper request from the paying bank if received by _____ p.m. local time of the presenting bank on the business day of presentment;

[or (ii) within [four hours] of receipt of a proper request if received after such time on the business day of presentment but within five (5) business days from the date of presentment,

or, (iii) within [twenty-four (24) hours] of receipt of a proper request if received after five (5) business days but within seven (7) calendar years from the date of presentment.]

The parties should provide for transmission of individual images, or snippets thereof, upon request within certain times. Subsections (b)(ii) and (iii) may not apply if images have been transmitted to the paying bank for storage, and receipt has been acknowledged (see next subsection). The parties also may wish to provide for regular transmission of certain predefined images.

- [(c) Presenting bank shall transmit to the paying bank images of all eligible checks presented on a day by _____ p.m. local time of the paying bank on [that day] [the _____ business day following the day of presentment.] Paying bank shall examine images received from the presenting bank for storage, and either acknowledge receipt, or request retransmission. Presenting bank is relieved of responsibility for all images whose receipt is acknowledged by paying bank.]

This paragraph should be used if the parties wish to provide for transmission of all images to the paying bank for storage on a regular schedule, which should take into consideration the need for images on demand to assist in the decision to pay or return.

- [(d)] A proper request for an image of a specific eligible check shall include _____ and shall be transmitted in accordance with this agreement. The transmission of images by the presenting bank shall comply with this agreement, with X9.46, and with the technical Addendum

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The parties should state whether electronic presentment of eligible checks is optional to the presenting bank under this agreement, when transmissions are permitted each day and whether reject repair is required. If reject repair is not required, the agreement should permit normal presentment of the original check.

- (b) Paying bank agrees that presentment of an eligible check is considered to occur upon delivery to it or its designated agent on a banking day for paying bank of MICR line data in accordance with this agreement. The paying bank waives any right to exhibition of the eligible check except as provided in this agreement.
- (c) By transmitting MICR line data from an eligible check to paying bank, presenting bank warrants, in addition to other warranties imposed by law, that:
 - (i) the presentment complies with this agreement;
 - (ii) the MICR line data transmitted accurately represents the MICR line data on the eligible check;
 - (iii) presenting bank is capable of retaining and transmitting an image of the eligible check in accordance with this agreement; and
 - (iv) presenting bank will not present the original eligible check to paying bank unless specifically requested by paying bank.
- (d) Presenting bank has no responsibility for determining whether an eligible check is properly payable, including whether:
 - (i) the check bears the authorized signature of the drawer or any other signature;
 - (ii) the check is stale dated or postdated; or
 - (iii) the check bears a legend restricting payment.
- (e) By entering into this agreement, paying bank warrants to presenting bank that it is legally authorized to carry out the terms of this agreement, and has obtained any agreement of the drawer of an eligible check, the payor of an eligible check that is payable through paying bank, a regulatory body, or other person, that is necessary for carrying out the terms of this agreement.

3. Settlement.

- (a) Paying bank shall settle for eligible checks presented under this agreement in accordance with Regulation CC, section 229.36(f), by [Fedwire funds transfer to presenting bank's account at the Federal Reserve Bank of _____] [debit/credit to presenting/paying bank's account on the books of paying/presenting bank] [other method agreed to by the parties]. If an eligible check is presented after 8:00 a.m. local time of paying bank, but before [2:00 p.m. or later ledger cutoff] that business day, the check is considered presented that banking day of paying bank, and paying bank shall settle by Fedwire funds transfer to such account by 11:00 a.m. Eastern Time the next banking day for paying bank.

The second sentence provides for a time of settlement on the next day for checks presented after 8:00 a.m. that is earlier than the close of Fedwire that next day, but later than midnight on the day of presentment. Checks presented after the cut-off hour specified would be considered presented the next banking day and settled by the close of Fedwire that next day.

- (b) Presenting bank shall settle for eligible checks for which an instruction to return is received by presenting bank by [5:00 p.m. local time of presenting bank] by means of [Fedwire funds transfer to paying bank's account at the Federal Reserve Bank of _____] [debit/credit to paying/presenting bank's account on the books of presenting/paying bank] [other method agreed to by the parties] by the close of Fedwire on the banking day of receipt of the instruction to return.
- (c) The parties agree to settle adjustment requests by [Fedwire funds transfer to their respective Reserve bank accounts] [entries to their respective correspondent accounts] [other method agreed to by the parties] as follows:

Banking Practices Agreement
for
Electronic Check Presentment With Image Capability

[Pro forma]

This AGREEMENT between _____, of _____, and _____, of _____ provides for electronic presentment of eligible checks [between the parties] [by the presenting bank to the paying bank,] by transmission of MICR line data and the retention of images of the checks by the presenting bank and transmission of the images on request to the paying bank.

The agreement should state whether each party or only one party may present checks under this agreement. See sections 1(f) and (g).

1. Definitions.

- (a) Unless otherwise defined, the terms have the meanings set forth or referred to in Regulation CC (12 CFR Part 229).
- (b) "X9.46" means the standard adopted by the Accredited Standards Committee on Financial Services of the American National Standards Institute as amended from time to time.
- (c) "Eligible check" means a check (i) payable by, at, or through the paying bank; [and] (ii) that contains a "9" in position 44 of the MICR line when received for collection by the presenting bank; [and (iii) that is in an amount of \$ _____ or less].

[Agreement (c) applies to eligible checks that the presenting bank elects to present electronically under this agreement.]

The parties may wish to set a dollar cutoff for eligible checks to avoid truncation of large dollar checks. The last bracketed sentence should be adopted if the presenting bank has an option to present eligible checks in their paper form. See section 2(a).

- (d) "Image" means an image of an eligible check that conforms with the requirements of X9.46 and that is of a quality [acceptable to paying bank as determined by testing with presenting bank]. The term includes the front and back of an eligible check unless a portion thereof is specified in this agreement.

The parties should agree on what quality of image is acceptable.

- (e) "MICR line data" means the information [] preprinted, or postencoded on an eligible check in accordance with X9.13.

The parties may want to specify only a portion of the MICR line for transmission.

- (f) "Paying bank" means [a party to this agreement] [_____], that is the paying bank as defined in Regulation CC, section 229.2(z), with respect to an eligible check.
- (g) "Presenting bank" means [a party to this agreement] [_____], that presents an eligible check under this agreement.

2. Presentment.

- (a) Presenting bank [shall] [may] present eligible checks to paying bank by transmitting the MICR line data to paying bank [between _____ and _____ on each banking day] in the format set forth in [X9.37] in accordance with this agreement. Presenting bank [shall] [is not required to] [shall not] repair or reenter MICR line data with respect to an eligible check that rejects from automated processing.

X9.46-1997**C.1.3. Returns and LDRINs**

In the near future, the paper items will be the basis for returns. In the longer term, workable procedures for the use of imaged returns may emerge.

- *Return requests: The paying bank should notify the presenting bank of returns by 5:00 p.m. on the first business day after the day of presentment. These requests would cover all items, large or small, dollar.*
- *Large dollar return notifications: The presenting bank must notify the BOFD of large dollar returns (ie. \$2,500 and above) by 4:00 p.m. ET the following day (ie. the second business day after the day of original presentment).*
- *Returns: The presenting bank, acting as a returning bank, has until midnight of the following day to initiate returns to the BOFD (ie. midnight of the second business day after the day of original presentment).*
- *Settlement: Settlement for returns follows the current procedures under Reg. CC and the UCC.*

C.1.4. Pricing

The presenting and paying bank would determine the existence and level of fees for provision of images or return services and cover any such arrangements in the BPA.

C.2. Banking practices agreement pro forma

The following text establishes a pro forma template for the creation of banking practices agreements. This pro forma covers some of the basic provisions two banks need to agree on before beginning one-way or two-way electronic presentment of checks supplemented by images of the checks.

This pro forma provides for :

1. Electronic presentment by transmission of MICR line data under X9.37 or other acceptable format, and subsequent transmission of images under X9.46 on per-check, or standing request. Checks eligible for presentment under this agreement are designated by a 9 in position 44 of the MICR line.
2. Presentment by 8:00 a.m. under the Regulation CC "same-day settlement" rule, and either long-term or temporary storage of the images by the presenting bank.

The pro forma contemplates that two banks could either simply make the choices set forth below, or vary and supplement the provisions in this form. Bank counsel should be consulted. Bracketed "[]" language is optional; *italicized* language is explanatory, and is not intended to be retained in the agreement.

♦ ♦ ♦ ♦ ♦ ♦ ♦

- b.) Long-term goal: *a presenting bank should store the paper checks until the normal return cycle is complete, approximately five days.*

C.1.2.2. Scenario II: Temporary storage of Images by presenter (Scenarios A & B)

Within Scenario II, there are two subordinate scenarios, A and B, as follows:

A.) The paying bank wants the presenting bank to provide all images the same day as the electronic presentment. Provision of these images generally would require transmission, although hard media might be an option in some cases.

- **Availability of selected image, in the manner specified by the BPA:**
 - **Priority:** *The presenting bank must be able to supply images upon request within one half hour for items presented that business day.*
- **Image storage:** *The presenting bank stores images until it receives acknowledgement of bulk image receipt, and release of responsibility, by the paying bank. The paying bank then assumes responsibility for maintenance of images in a manner that will sustain the quality for seven years (or other local law).*
- **Paper storage:**
 - a.) **Current:** *a presenting bank should store the checks for sixty days, a period covering the statement cycle and a reasonable period for customer requests of items thereafter.*
 - b.) **Long-term goal:** *a presenting bank should store the paper checks until the normal return cycle is complete.*

B.) ~~The payor wants to receive all check images, but not the same day as electronic presentment of the items. Generally, the presenting bank would supply these on hard media, although transmission would be an option.~~

- **Availability of selected images, in the manner specified by the BPA:**
 - **Priority:** *The presenting bank must be able to supply images upon request within one half hour for items presented that business day.*
 - **Short-term:** *a presenting bank should provide an image of an item presented within the last five business days, within four hours (during time frame specified by the BPA) of receipt of the request for an image from the paying bank.*
- **Predefined recurring images:** *A presenting bank will provide images, based on parameters predefined by the paying bank, every business day that it presents items electronically, according to the terms of the BPA.*
- **Image storage:** *The presenting bank stores images until it receives acknowledgment of bulk image receipt, and release of responsibility, by the paying bank. Payor then assumes responsibility for maintenance of images in a manner that will sustain the quality for seven years (or other local law).*
- **Paper storage:**
 - a.) **Current:** *a presenting bank should store the checks for sixty days, a period covering the statement cycle and a reasonable period for customer requests of items thereafter.*
 - b.) **Long-term goal:** *a presenting bank should store the paper checks until the normal return cycle is complete.*

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C.1.1.2. Presentment and settlement times

If the presenting bank presents items electronically by 8:00 a.m. (local), the paying bank will pay for these items in same day funds by the close of Fedwire. This parallelism with Same-Day Settlement (SDS) is necessary to provide terms at least as good as those

If a presenting bank presents items electronically between 8:00 a.m. and 2:00 p.m. (local), or later ledger cut-off, the paying bank would pay for those items in good funds by 11:00 a.m. ET the following day. The purpose of this presentment time is to provide consistency with the treatment of items that miss the 8:00 a.m. (local) SDS presentment deadline. For those items, the return clock starts the same day and payment (but not in same-day funds) must take place by midnight of the same day.

C.1.2. Checks and images: storage, availability, and usability

Paying banks may choose different scenarios regarding provision of images by presenting banks that affect both storage times for paper checks and turnaround times for image requests. Participants in exchange also may want to include in the BPA specific conditions and timeframes relevant to possible resends of images that might be necessary, as a result of, for example, unacceptable quality or technical problems. Additionally, the timeframe and method of delivery of paper, if requested, should be clearly defined.²

C.1.2.1. Scenario I: Long-term storage of images by presenting bank

The paying bank wants the presenting bank to store the images it captures on items presented electronically to the paying bank.

- **Image storage:** *The presenting bank stores images in a manner that will sustain the quality of the image for seven years (or longer, if required by local law applicable to collecting, or payor, bank).*
- **Availability of selected images, in the manner specified by the BPA:**
 - **Priority:** *a presenting bank should provide an image of an item presented that business day, within one half hour of the request for the image by the paying bank.*
 - **Short-term:** *a presenting bank should provide an image of an item presented within the last five business days, within four hours (during time frame specified by the BPA) of receipt of the request for an image from the paying bank.*
 - **Long-term:** *a presenting bank should provide an image of an item within twenty-four hours of receipt of the request from the paying bank, if it presented the item electronically during the time period spanning seven (or more) years to six business days ago.*
- **Availability of predefined recurring images:** *A presenting bank will provide images, based on parameters predefined by the paying bank, every business day that it presents items electronically according to the terms of the BPA.*
- **Paper storage:** *The presenting bank needs to pull items to return timely to the bank of first deposit (if collector is not the BOFD) upon receipt of return requests from the paying bank.*
 - a.) **Current:** *a presenting bank should store the checks for sixty days, a period covering the statement cycle and a reasonable period for customer requests of items thereafter.*

2

In all the following examples, an agent of the presenting bank could perform image capture and archive services on its behalf.

Annex C
(Informative)

Banking practices agreement

This annex provides information for use in the public domain and is not part of the standard.

A Banking Practices Agreement (BPA) is an agreement between parties who wish to participate in Interbank Image Interchange. This annex comprises three sections: (1) a section providing description of a suggested framework to support interbank image interchange covering Presentment and Settlement, Storage and Availability of Checks and Images, Returns and Large Dollar Return Item Notification, and Pricing. This framework draws on existing regulations, such as the Uniform Commercial Code (UCC) and Regulation CC (Federal Reserve), as a base; (2) a section presenting this framework in legal terminology, with specific references to existing regulation, as a model, or proforma for that part of the agreement dealing with the above clearing issues; and (3) a section containing technical issues or requirements that a BPA should address to support the Finance Image Interchange standard (see clause 4 for Summary of Standard Required Elements).

C.1. Suggested framework for image-based electronic check presentment

The purpose of a suggested framework for image based electronic check presentment is to facilitate the development of such presentment by providing a set of guidelines. These guidelines include what paying and presenting banks normally would expect from each other.

The Banking Practices Agreement, which a presentor and a payor would establish prior to actual presentment of image-based electronic checks, would be the logical vehicle for agreeing with the specifics of the suggested framework, or for varying such specifics by agreement. Whether the suggested terms of the proforma are accepted as is, or are varied by agreement, both parties to the agreement should consult bank counsel as part of the negotiation process.

C.1.1. Presentment and settlement

C.1.1.1. Definition

Presentment by a presenting bank occurs upon the receipt of an electronic transmission of the check MICR line and related information in the ASC standard format (X9.37), or other acceptable format, by the paying bank whose customer placed the 9 in position 44 of the MICR line. The presenting bank warrants to the paying bank that it has captured an image of acceptable quality of each item presented. This warranty provides insurance for the paying bank against a presenting bank's presenting items that have no images, or unusable images. A presenting bank would present electronically all items it processes drawn on that paying bank and identified by a 9, not just on selected items, unless varied by agreement. Such presentment depends upon the prior existence of a Banking Practices Agreement (BPA) between the presenting and the paying banks.¹

¹

The BPA also could enable two institutions to perform image-based exchange on items that do not have a 9 in position 44 of the MICR line.

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B.4 JBIG

Single progression sequential JBIG coding specified in CCITT T.82 (reference [4] in clause 2) shall be used. As defined in annex A of CCITT T.82, the maximum support for the JBIG parameter D is zero, the maximum support JBIG parameter L_p is Y_p , and no support is required for the parameters HLTOL, SEQ, TPDON, DPON, DPPRIV, and DPLAST. The rest of the parameters are defined in table A-1 of annex A in CCITT T.82.

B.5 ABIC

The ABIC coding with the standard model/adaptor/coder (MAC), defined in the IBM Journal of Research and Development, Vol. 32, No.6, pp. 717-795, November, 1988, shall be used with additional constraints as follows:

In the compressed state, all images must be padded to a width which is a multiple of eight pixels. The padding bits are normally zero bits (0's). These padding bits shall not be counted as part of the image width parameter.

For gray-scale images, pixel values shall be Gray coded as defined by F. Gray in US Patent 2632058.

For a given binary presentation of a number $b = (b_n, \dots, b_1, b_0)$, the corresponding Gray code is

$g = (g_n, \dots, g_1, g_0)$, where $g_n = b_n$ and $g_k = b_{k+1} \oplus b_k$ for $k=0, 1, \dots, n-1$, and where $1 \oplus 0 = 0 \oplus 1 = 1$, $1 \oplus 1 = 0$, and $0 \oplus 0 = 0$.

After Gray coding, the gray-scale bit planes shall be concatenated into a single virtual binary image in such an order: the most significant bit plane first.

Annex B **(normative)**

Description of compression algorithms

This annex specifies compression algorithms applicable to this standard.

B.1 Uncompressed

Each pixel of uncompressed image shall be encoded as standard binary numbers. Images shall be bitonal or gray-scale. This standard only supports the following pixel precisions: one bit per pixel, two bits per pixel, four bits per pixel, six bits per pixel, and eight bits per pixel.

For bitonal uncompressed images, eight pixels shall be packed into one byte in the order of the most significant bit first.

For gray-scale images, the packing of pixels into bytes shall occur as follows:

- *Uncompressed data shall be packed with the most significant bit of a pixel into the most significant bit of a byte, or of the remaining unfilled portion of the byte.*
- *For images with the pixel precision of two bits per pixel, four pixels shall be packed into one byte.*
- *For images with the pixel precision of four bits per pixel, two pixels shall be packed into one byte.*
- *For images with the pixel precision of six bits per pixel, one pixel shall be packed into one byte with the low two bits of the byte being zero-filled to complete each byte.*

Each line of an uncompressed image shall be padded with zeros such that the following line starts on a byte-boundary. The padding bits of the last byte on each line shall not be counted as part of the image width parameter.

B.2 CCITT T.6 Compression

The base facsimile coding scheme specified in CCITT T.6 (reference [6] in clause 2) shall be used. Optional facsimile coding schemes shall not be used.

B.3 JPEG Baseline (JPEG Interchange Format)

JPEG Baseline with JPEG interchange format specified in CCITT T.81 (reference [5] in clause 2) shall be used. Images compressed by this standard shall consist of only one component (gray-scale).

JPEG Baseline compression requires that, before performing compression, all pixels of an uncompressed grayscale image shall be packed into bytes as follows:

Uncompressed data shall be packed with the most significant bit of a pixel into the most significant bit of a byte.

One pixel shall be packed into one byte with the low, unused bits of the byte being zero-filled to complete each byte.

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```

<ece_business_date_range> ::= [<ece_business_date_start>]<us>[<ece_business_date_end>]
    <ece_business_date_start> (08/08) ::= <x9_date>
    <ece_business_date_end> (08/08) ::= <x9_date>

<ece_seq_number_range> ::= [<ece_seq_number_start>]<us>[<ece_seq_number_end>]
    <ece_seq_number_start> (01/15) ::= <string>
    <ece_seq_number_end> (01/15) ::= <string>

<ece_cycle_number_range> ::= [<ece_cycle_number_start>]
    <us>[<ece_cycle_number_end>]
    <ece_cycle_number_start> (01/02) ::= <string>
    <ece_cycle_number_end> (01/02) ::= <string>

<amount_range> ::= [<amount_start>]<us>[<amount_end>]
    <amount_start> (01/12) ::= <numeric>
    <amount_end> (01/12) ::= <numeric>

<account_number_range> ::= [<account_number_start>]<us>[<account_number_end>]
    <account_number_start> (01/18) ::= <string>
    <account_number_end> (01/18) ::= <string>

<item_serial_number_range> ::= [<item_serial_number_start>]
    <us>[<item_serial_number_end>]
    <item_serial_number_start> (01/10) ::= <string>
    <item_serial_number_end> (01/10) ::= <string>

<private_locator_range> ::= [<private_locator_start>]<us>[<private_locator_end>]
    <private_locator_start> (01/80) ::= <string>
    <private_locator_end> (01/80) ::= <string>

<restart_point_indicator> (01/1) ::= <string>

<search_user_data_present_indicator> (01/01) ::= <sudpi_absent> | <sudpi_present>

    <sudpi_absent> ::= "0" -- [DEFAULT]
    <sudpi_present> ::= "1"

-- END of protocol

END --FIIP Interchange Syntax
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<no_sec_reqd> ::= "00" - DEFAULT
 <digital_sign_only> ::= "10"
 <macd_only> ::= "20"
 <encryption_only> ::= "01"
 <encryption_digital_sign_only> ::= "11"
 <encryption_and_macd_only> ::= "21"

- Search/list and Retrieval data elements

<scale_size_requested>(01/03) ::= <numeric> -- represents a percentage (%)

<response_media>(01/03) ::= <electronic_format> | <tape> | <optical_disk> | <diskette> |
 <paper_copy_of_item> | <original_item> | <reserved_for_x9_media> | <user_defined_media>

<electronic_format> ::= "0" - DEFAULT
 <tape> ::= "1"
 <optical_disk> ::= "2"
 <diskette> ::= "3"
 <paper_copy_of_item> ::= "4"
 <original_item> ::= "5"
 <reserved_for_x9_media> ::= "6" | ... | "799"
 <user_defined_media> ::= "800" | ... | "999"

<transport_media_requested>(01/02) ::= <elec_com_link> | <hand_courier> | <overnight_mail> |
 <regular_mail> | <fax> | <private_transport> | <reserved_for_x9_trasp_media>

<elec_com_link> ::= "0" - DEFAULT
 <hand_courier> ::= "1"
 <overnight_mail> ::= "2"
 <regular_mail> ::= "3"
 <fax> ::= "4"

<private_transport> ::= "5" | ... | "9"
 <reserved_for_x9_trasp_media> ::= "10" | ... | "99"

<processing_priority>(01/01) ::= <low> | <medium> | <high> | <user_defined_priority>

<low> ::= "1"
 <medium> ::= "5"
 <high> ::= "9"
 <user_defined_priority> ::= "2" | "3" | "4" | "6" | "7" | "8"

<retain_custody_indicator>(01/01) ::= <retain_custody> | <pass_custody>

<retain_custody> ::= "0" - DEFAULT
 <pass_custody> ::= "1"

<view_side_requested>(01/01) ::= <frontal_view> | <rear_view> |
 <frontal_and_rear_view>

<frontal_view> ::= "0" - DEFAULT
 <rear_view> ::= "1"
 <frontal_and_rear_view> ::= "2"

<view_snippet_region>(01/31) ::= <snippet_name> | <snippet_detail_info>

<obsoletes_query_request_id>(34/92) ::= [<ts_ref_id>] [<us> <qrd_id>]

<max_lapse_time>(01/06) ::= <numeric> - expressed in seconds

<max_matching_views_reqd>(01/06) ::= <numeric>

<acceptable_compression_ids> ::= <view_compression_algo_id> { <us> <view_compression_algo_id> }

<payor_bank_rn>(09/09) ::= <routing_number>

- Search and list only criteria

```
[ <amount_range> ] <gs>
[ <account_number_range> ] <gs>
[ <item_serial_number_range> ] <gs>
[ <private_locator_range> ] <gs>
[ <restart_point_indicator> ] <gs>
[ <search_user_data_present_indicator> ] <tr>
```

– Query request type

```
<query_request_type> (01/02) ::= <cancel_request> | <retrieval_request> | <search_request> |
<restart_request> | <reserved_for_X9_types> | <private_request_types>
```

```
<cancel_request>          ::= "0"
<retrieval_request>       ::= "1"
<search_request>          ::= "2"
<restart_request>         ::= "3"
<reserved_for_X9_types>   ::= "4" | ... | "50"
<private_request_types>   ::= "51" | ... | "99"
```

– Query Request Data segment identifier

```
<qrd_id> (18/50)          ::= <ts_ref_id> "." <local_value>
```

– Cancel criteria for an outstanding query request

```
<subject_ref_id> (22/50) ::= <ref_id_type> <us> <ref_id_value>
```

```
<ref_id_type> (01/01) ::= <ts_ref_id> | <qrd_id> | <dsd_ref_id> | <item_ref_id>
<ts_ref_id>              ::= "0"
<qrd_id>                 ::= "1"
<dsd_ref_id>             ::= "2"
<item_ref_id>            ::= "3"
```

```
<ref_id_value> (20/58) ::= <ts_ref_id> | <qrd_id> | <dsd_ref_id> | <item_ref_id>
```

– Retrieval imaged item criteria

```
<retrieval_image_key> (34/v) ::= <image_key> { <us> <image_key> }
```

– Operational data

```
<color_indicator> (01/02) ::= <bw_or_gray_scale> | <bw_only> |
<gray_scale_only> | <bw_and_gray_scale> | <x9_use> | <private_use>
```

```
<bw_or_gray_scale>       ::= "0"
<bw_only>                ::= "1"
<gray_scale_only>        ::= "2"
<bw_and_gray_scale>      ::= "3"
<x9_use>                 ::= "4" | ... | "50"
<private_use>            ::= "51" | ... | "99"
```

```
<output_type_requested> (01/01) ::= <item_info_only> | <item_info_and_user_data> |
<item_info_and_item_views> | <item_info_user_data_and_views> | <image_keys_only> |
<views_of_item_only>
```

```
<item_info_only>         ::= "0"
<item_info_and_user_data> ::= "1"
<item_info_and_item_views> ::= "2"
<item_info_user_data_and_views> ::= "3"
<image_keys_only>        ::= "4"
<views_of_item_only>     ::= "5"
```

```
<secured_results_request_indicator> (02/02) ::= <no_sec_reqd> | <digital_sign_only> | <macd_only> |
<encryption_only> | <encryption_digital_sign_only> | <encryption_and_macd_only>
```

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```

<query_requests_fg> ::=
  <fg_header>           -- value for <functional_group_id> = "73"
  [ <fg_security_header> ] -- for data integrity check the entire FG
  [ <signature_ts> ]      -- for authentication of the originator of the entire FG
  -- FIIP query request set transaction sets
  { <query_request_ts> }
  [ <fg_security_trailer> ] -- for data integrity check of the entire FG
  -- Functional Group Trailer
  <fg_trailer>

```

– Query transaction set definition used for transmitting search, retrieve, and cancel requests

```

<query_request_ts> ::=
  <trans_set_header>    -- value for <trans_set_id> = "QTS"
  [ <ts_security_header> ] -- for data integrity check the entire TS
  [ <signature_data> ]    -- for only signing the data contained after the signature segment
  [ <signature> ]        -- for authentication of the originator of the entire TS
  <general_FFI_extensions>
  { <query_request_loop> }
  [ <ts_security_trailer> ] -- for data integrity check of the entire TS
  <trans_set_trailer>

```

– Query request loop to relate optional user data with a query request data segment

```

<query_request_loop> ::=
  <loop_header>
  <query_request_data>
  [ <user_data> ]
  <loop_trailer>

```

– Query request data segment definition used for Search/List, Retrieve, and Cancel requests

```

<query_request_data> ::= QRD <gs>
  <query_request_type> <gs>
  <qrd_id> <gs>
  -- Cancel Criteria
  [ <subject_ref_id> ] <gs>
  -- Retrieval Criteria
  [ <retrieval_image_key> ] <gs>
  -- Operational data
  [ <color_indicator> ] <gs>
  [ <output_type_requested> ] <gs>
  [ <secured_results_request_indicator> ] <gs>
  [ <scale_size_requested> ] <gs>
  [ <response_media> ] <gs>
  [ <transport_media_requested> ] <gs>
  [ <processing_priority> ] <gs>
  [ <retain_custody_indicator> ] <gs>
  [ <obsoletes_query_request_id> ] <gs>
  [ <max_lapse_time> ] <gs>
  [ <max_matching_views_reqd> ] <gs>
  [ <view_side_requested> ] <gs>
  [ <view_snippet_region> ] <gs>
  [ <acceptable_compression_ids> ] <gs>
  [ <payor_bank_nm> ] <gs>
  -- Search (and list) criteria
  [ <ece_business_date_range> ] <gs>
  [ <ece_seq_number_range> ] <gs>
  [ <ece_cycle_number_range> ] <gs>

```

<application_ack_data> ::= ADS <gs>
 <application_ack_created_date_time> <gs>
 <application_ack_reason_code> <gs>
 <application_ack_diagnostic_code> <gs>
 [<subject_ts_ref_id>] <gs>
 [<subjects_lsd_ref_id>] <gs>
 [<subject_item_ref_id>] <gs>
 [<subject_item_view_id>] <gs>
 [<subject_qrd_id>] <gs>
 [<number_items_matching_criteria>] <gs>
 [<supplemental_info>]
 [<image_keys_matching_criteria>] <gs>
 [<restart_point_indicator>] <tr>

<application_ack_created_date_time>(15/15) ::= <x9_date><us><time> -- time is constrained to HHMMSS

<application_ack_reason_code>(01/01) ::= <accepted> |
 <results_of_a_list_request> | <rejected_referenced_ts> | <failure_of_operation>

<accepted> ::= "0"
 <results_of_a_list_request> ::= "1"
 <rejected_referenced_ts> ::= "2"
 <failure_of_operation> ::= "3"

<application_ack_diagnostic_code>(01/03) ::=
 <no_error> | <security_failure> | <protocol_violation>
 <dpa_violation> | <unable_to_locate> | <image_format_error> | <out_of_balance> |
 <arrived_too_late> | <constraints_exceeded> | <unwilling_to_perform> | <dc_reserved_for_X9_use> |
 <user_defined_diagnostic_codes>

<no_error> ::= "0" -- for reason code = <accepted> only
 <security_failure> ::= "1"
 <protocol_violation> ::= "2"
 <dpa_violation> ::= "3"
 <unable_to_locate> ::= "4"
 <image_format_error> ::= "5"
 <out_of_balance> ::= "6"
 <arrived_too_late> ::= "7"
 <constraints_exceeded> ::= "8"
 <unwilling_to_perform> ::= "9"
 <dc_reserved_for_X9_use> ::= "10" | ... | "499"
 <user_defined_diagnostic_codes> ::= "500" | ... | "999"

<subject_ts_ref_id>(16/42) ::= <ts_ref_id>- to acknowledge at the transaction set level
 <subject_lsd_ref_id>(18/50) ::= <lsd_ref_id>- to acknowledge at the group of items level
 <subject_item_ref_id>(20/58) ::= <item_ref_id>- to acknowledge at the imaged item level
 <subject_item_view_id>(22/66) ::= <item_view_id>- to acknowledge at the item view level
 <subject_qrd_id>(18/50) ::= <qrd_id>- to acknowledge at the query request level
 <number_items_matching_criteria>(01/06) ::= <numeric>
 <image_keys_matching_criteria>(34/v) ::= <image_key> { <us><image_key> }
 <supplemental_info>(01/80) ::= <string>

– Query or cancel query request functional group definition

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<interpret_bitmap>(01/01) ::= <min_pixel_value_is_white> | <min_pixel_value_is_black>

<min_pixel_value_is_white> ::= "0"

<min_pixel_value_is_black> ::= "1"

<orientation>(01/01) ::= <dr_tb> | <rl_tb> | <rl_bb> | <dr_bb> | <tb_lr> | <tb_rl> | <bt_rl> | <bt_lr>

<dr_tb> ::= "1" - DEFAULT

<rl_tb> ::= "2"

<rl_bb> ::= "3"

<dr_bb> ::= "4"

<tb_lr> ::= "5"

<tb_rl> ::= "6"

<bt_rl> ::= "7"

<bt_lr> ::= "8"

<creation_computer>(01/32) ::= <string>

<view_description>(01/32) ::= <string>

<scanner_mfgr_name>(01/30) ::= <string>

<scanner_model_name>(01/15) ::= <string>

<view_capture_software_id>(01/30) ::= <string>

-- Application Acknowledgment functional group

<application_ack_fg> ::=

<fg_header> - where <functional_group_id> value = "72"

[<fg_security_header>] - for data integrity check the entire FG

[<signature_ts>] - for authentication of the originator of the entire FG

- Acknowledgment transaction sets

{ <application_ack_ts> }

[<fg_security_trailer>] - for data integrity check of the entire FG

<fg_trailer>

-- Transaction set for Application acknowledgment of specific requests

<application_ack_ts> ::=

<trans_set_header> - where <trans_set_id> value = "ATS"

[<ts_security_header>] - for data integrity check the entire TS

[<signature_data>] - for only signing the data contained after the signature segment

[<signature>] - for authentication of the originator of the entire TS

<general_FFI_extensions>

{ <application_ack_data> }

[<ts_security_trailer>] - for data integrity check of the entire TS

<trans_set_trailer>

-- Details for acknowledging specific requests

<x1_offset>(01/06) ::= <decimal_number>
 <x2_offset>(01/06) ::= <decimal_number>
 <y1_offset>(01/06) ::= <decimal_number>
 <y2_offset>(01/06) ::= <decimal_number>

<snippet_units_of_measure> ::= <units_of_measure>

<clipping_info>(02/45) ::= [<clipping_origin>] <us> [<clipping_offset>]

<clipping_origin>(01/01) ::= <top_right_corner_of_imaged_item> |
 <top_left_corner_of_imaged_item> | <bottom_right_corner_of_imaged_item> |
 <bottom_left_corner_of_imaged_item>

<top_right_corner_of_imaged_item> ::= "1"
 <top_left_corner_of_imaged_item> ::= "2"
 <bottom_right_corner_of_imaged_item> ::= "3"
 <bottom_left_corner_of_imaged_item> ::= "4"

<clipping_offset>(04/43) ::= [<h1>] <us> [<h2>] <us> [<v1>] <us> [<v2>]

<h1>(01/10) ::= <numeric> -- Measured in PIXELs - DEFAULT = 1
 <h2>(01/10) ::= <numeric> -- Measured in PIXELs - DEFAULT = view's maximum horizontal dimension
 <v1>(01/10) ::= <numeric> -- Measured in PIXELs - DEFAULT = 1
 <v2>(01/10) ::= <numeric> -- Measured in PIXELs - DEFAULT = view's maximum vertical dimension

<embedded_header_info> ::= <embedded_header_indicator><us><view_raster_data_offset>

<embedded_header_indicator>(01/03) ::= <spiff> | <ansi_alim_oda> | <tiff_6> | <doca_fs_11> |
 <reserved_for_x9> | <private_use>

<spiff> ::= "0"
 <ansi_alim_oda> ::= "1"
 <tiff_6> ::= "2"
 <doca_fs_11> ::= "3"
 <reserved_for_x9> ::= "4" | ... | "499"
 <private_use> ::= "500" | ... | "999"

<view_raster_data_offset>(01/08) ::= <numeric>

- View Decoding Information

<pixels_per_line>(01/08) ::= <numeric>

<number_of_lines>(01/08) ::= <numeric>

<resolution_unit>(01/01) ::= <none> | <dnch> | <centimeter>

<none> ::= "1"
 <dnch> ::= "2" -- DEFAULT
 <centimeter> ::= "3"

<resolution_along_line>(01/08) ::= <numeric>

<resolution_across_line>(01/08) ::= <numeric>

<bits_per_pixel>(01/01) ::= <one> | <two> | <four> | <six> | <eight>

<one> ::= "1" -- black and white
 <two> ::= "2" -- gray scale
 <four> ::= "4" -- gray scale
 <six> ::= "6" -- gray scale
 <eight> ::= "8" -- gray scale

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```

<interpret_bitmap> <gs>
[ <orientation> ] <gs> -- default { lr_tb }
- Partial View Information
[ <snippet_info> ] <gs> -- default not present
[ <clipping_info> ] <gs> -- value shall be not present when image is not clipped
- Other Information
[ <embedded_header_info> ] <gs>
[ <creation_computer> ] <gs>
[ <view_description> ] <gs>
[ <scanner_mfgr_name> ] <gs>
[ <scanner_model_name> ] <gs>
[ <view_capture_software> ] <tr> -- default { none-present }

- FIIP view detail segment data elements

<item_view_id> (22/66) ::= <item_ref_id> "." <local_value>
<view_creation_date> (08/08) ::= <X9_date>
<view_raster_data_size> (01/10) ::= <numeric>
<view_side_indicator> (01/01) ::= <frontab> | <rear>
    <frontab> ::= "0" -- DEFAULT
    <rear> ::= "1"
<snippet_info> (01/31) ::= [ <snippet_name> ] <us>
[ <snippet_origin> <us>
<snippet_offset> <us>
[ <snippet_units_of_measure> ] ] -- ABSENCE assumed to be INCH unless stated otherwise

<snippet_name> (01/02) ::= <courtesy_amount> | <payee_name> | <payor_name> | <micr_code_line> |
<signature> | <date_from_item> | <legal_amount> | <payee_endorsement> | <bofd_endorsement> |
<subsequent_bank_endorsement> | <subsequent_bank_name> | <reserved_for_x9_snippet_use> |
<reserved_for_private_snippet_use> | <name_not_provided>

<name_not_provided> ::= "0"
<courtesy_amount> ::= "1"
<payee_name> ::= "2"
<payor_name> ::= "3"
<micr_code_line> ::= "4"
<signature> ::= "5"
<date_from_item> ::= "6"
<legal_amount> ::= "7"
<payee_endorsement> ::= "8"
<bofd_endorsement> ::= "9"
<subsequent_bank_endorsement> ::= "10"
<subsequent_bank_name> ::= "11"

<reserved_for_x9_snippet_use> ::= "12" | ... | "49"
<reserved_for_private_snippet_use> ::= "50" | ... | "99"

<snippet_origin> (01/01) ::= <top_right_corner_of_snippet> | <top_left_corner_of_snippet> |
<bottom_right_corner_of_snippet> | <bottom_left_corner_of_snippet>

<top_right_corner_of_snippet> ::= "1"
<top_left_corner_of_snippet> ::= "2"
<bottom_right_corner_of_snippet> ::= "3"
<bottom_left_corner_of_snippet> ::= "4"

<snippet_offset> (07/27) ::= <x1_offset> <us> <x2_offset> <us> <y1_offset> <us> <y2_offset>

```

```

<compression_indicators> <gs>
<view_count> <gs>
[ <dlh_cross_references> ] <gs>
[ <item_amount> ] <gs>
[ <payor_bank_routing_number> ] <gs>
[ <image_key> ] <gs>
[ <user_data_present_indicator> ] <tr>

<item_ref_id> (20/58) ::= <isd_ref_id> "." <local_value>
<compression_indicators> ::= <view_compression_algorithm_id>
{ <us> <view_compression_algorithm_id> }

<item_views_length> (01/10) ::= <numeric>
<view_count> (01/08) ::= <numeric>
<dlh_cross_references> (16/257) ::= <ts_cross_reference>
<item_amount> (02/12) ::= <numeric>
<payor_bank_routing_number> (09/09) ::= <routing_number>
<image_key> (34/34) ::= <string> |
  <ece_routing_number> <ece_business_date> <ece_sequence_number> <ece_cycle_number>

  <ece_routing_number> ::= <routing_number>
  <ece_business_date> ::= <x9_date>
  <ece_sequence_number> ::= <string>
  <ece_cycle_number> ::= <string>

<user_data_present_indicator> (01/01) ::= <absent> | <present>

  <absent> ::= "0" -- DEFAULT
  <present> ::= "1"

```

– Information for each view definition

```

<item_views> ::=
  <loop_header> -- value for <loop_id> = "3"
  <item_view_data>
  <view_binary_data>
  <loop_trailer> -- value for <loop_id> = "3"

```

– Compressed (or uncompressed) binary raster data for a single (partial or full) view.

```

<view_binary_data> ::= <bin_segment>

```

– FIIP view's raster details definition, i.e., for a single view of a single side

```

<item_view_data> ::= IVS <gs>
  – View processing information
  <item_view_id> <gs>
  <view_creation_date> <gs>
  <view_compression_algo_id> <gs>
  <view_raster_data_size> <gs>
  [ <view_side_indicator> ] <gs> -- default ( frontal )
  – View decoding additional information
  <pixels_per_line> <gs>
  <number_of_lines> <gs>
  [ <resolution_unit> ] <gs>
  <resolution_along_line> <gs>
  <resolution_across_lines> <gs>
  <bits_per_pixel> <gs>

```

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```

<item_group_ts> ::=
  <trans_set_header> -- value for <trans_set_id> = "ITS"
  - General transaction set information
  <general_FII_extensions>
  - ITEM_SUBGROUP loop contains views for items that have been grouped into bundles.
  { <item_subgroup> }
  - X9 transaction set trailer
  <trans_set_trailer>

```

- Item subgroup (loop) structure definition

```

<item_subgroup> ::=
  <loop_header> -- value for <loop_id> = "1"
  <item_subgroup_information>
  { <item_data_loop> }
  <loop_trailer>

```

- FIIP Item Subgroup Information segment definition

```

<item_subgroup_information> ::= ISD <gs>
  <item_data_loop_length> <gs>
  <dsd_ref_id> <gs>
  <dsd_item_count> <gs>
  <dsd_subgroup_recipient> <gs>
  [ <dsd_cross_references> ] <gs>
  [ <dsd_subgroup_amount> ] <tr>

  <item_data_loop_length>(02/10) ::= <numeric>
  <dsd_ref_id>(18/50) ::= <ts_ref_id> "." <local_value>

  <local_value>(01/07) ::= <numeric>
  <dsd_item_count>(01/08) ::= <numeric>
  <dsd_cross_references>(16/257) ::= <ts_cross_references>
  <dsd_subgroup_amount>(01/16) ::= <numeric>
  <dsd_subgroup_recipient>(04/18) ::= <fii_id_qualifier> <us> <dsd_subgroup_recipient_id>
    - identifies to whom an Image Item is to be addressed.

```

```

  <dsd_subgroup_recipient_id> (01/15) ::= <string>

```

- Item data definition

```

<item_data_loop> ::=
  <loop_header> -- value for <loop_id> = "2"
  <item_information>
  [ <signature_data> ]
  [ <signature> ]
  [ <user_data> ]
  { <item_views> }
  <loop_trailer> -- value for <loop_id> = "2"

```

- FIIP Item information segment definition

```

<item_information> ::= IIH <gs>
  <item_views_length> <gs>
  [ <item_ref_id> ] <gs>

```

```

<standard_version> ::= <standards_identifier><gs><version_id>
  <standards_identifier> (01/01) ::= <id> -- data element I10 : X12.5
  <version_id> (05/05) ::= <id> -- value is 00305, data element I11 : X12.5
<inter_control> (09/09) ::= <numeric>-- data element I12 : X12.5
<ack_requested> (01/01) ::= <id>-- data element I13 : X12.5
<test_indicator> (01/01) ::= <id>-- data element I14 : X12.5
<subelement_separator> (01/01) ::= <string>-- data element I15 : X12.5
<number_groups> (01/05) ::= <numeric>-- data element I16 : X12.5

```

– Financial Data functional group structure definition

```

<financial_data_fg> ::=
  <fg_header> -- value for <functional_group_id> = "70"
  [ <fg_security_header> ] -- for data integrity check the entire FG
  [ <signature_ts> ] -- for authentication of the originator of the entire FG
  -- NOTE - Security is not explicitly provided below this point in the FG structure
  { <financial_data_t_set> }
  [ <fg_security_trailer> ] -- for data integrity check of the entire FG
  <fg_trailer>

```

– Financial Data transaction set structure definition

```

<financial_data_t_set> ::=
  <trans_set_header> -- value for <trans_set_id> = "FTS"
  <general_FI_extensions>
  -- Financial data often encoded per X9.37
  <financial_data>
  -- X12 trailer for transaction sets
  <trans_set_trailer>

```

– Financial data segment definition

```

<financial_data> ::= <bin_segment>

```

– Item Views functional group structure definition

```

<item_views_fg> ::=
  <fg_header> -- value for <functional_group_id> = "71"
  [ <fg_security_header> ] -- for data integrity check the entire FG
  [ <signature_ts> ] -- for authentication of the originator of the entire FG
  -- NOTE - Security is not explicitly provided below this point in the FG structure
  -- FIIP group of related views transaction sets
  { <item_group_ts> }
  [ <fg_security_trailer> ] -- for signing or integrity check the entire functional group
  -- Functional Group Trailer
  <fg_trailer>

```

– Item Group transaction set structure definition

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```

<abc> ::= "5"
<reserved_for_X9> ::= "6" | ... | "499"
<private> ::= "500" | ... | "999"

```

– End common elements

– The FII protocol's interchange structure

```

<fii_structure> ::=
  <inter_header>
  { <financial_data_fg> }
  { <item_views_fg> }
  { <functional_ack_fg> }
  { <application_ack_fg> }
  { <query_requests_fg> }
  <inter_trailer>
  – At least one functional group is always present even though the
  – Interchange basic structure identifies each as optional.

```

– Interchange Header and Trailer imported from X12.5:1991, included for reference only

```

<inter_header> ::= ISA <gs>
  <authorization> <gs>
  <security> <gs>
  <sender> <gs>
  <receiver> <gs>
  <inter_date_time> <gs>
  <standard_version> <gs>
  <inter_control> <gs>
  <ack_requested> <gs>
  <test_indicator> <gs>
  <subelement_separator> <tr>

<inter_trailer> ::= IEA <gs> <number_groups> <gs> <inter_control> <tr>

```

– ISA and IEA component data definitions

```

<authorization> ::= <authorization_qualifier> <gs> <authorization_info>
  <authorization_qualifier> (02/02) ::= <id> – data element I01 : X12.5
  <authorization_info> (10/10) ::= <string> – data element I02 : X12.5

<security> ::= <security_qualifier> <gs> <security_info>
  <security_qualifier> (02/02) ::= <id> – data element I03 : X12.5
  <security_info> (10/10) ::= <string> – data element I04 : X12.5

<sender> ::= <inter_id_qualifier> <gs> <sender_id>
  <inter_id_qualifier> (02/02) ::= <id> – data element I05 : X12.5
  <sender_id> (15/15) ::= <string> – data element I06 : X12.5

<receiver> ::= <inter_id_qualifier> <gs> <receiver_id>
  <receiver_id> (15/15) ::= <string> – data element I07 : X12.5

<inter_date_time> ::= <inter_date> <gs> <inter_time>
  <inter_date> (06/06) ::= <date> – data element I08 : X12.5
  <inter_time> (04/04) ::= <hour> <minute> – data element I09 : X12.5

```

<type_of_request>(01/02) ::= <func_ack_is_requested> | <app_ack_is_requested> |
 <both_fa_and_aa_are_requested>

<func_ack_is_requested> ::= "0"
 <app_ack_is_requested> ::= "1" -- DEFAULT
 <both_fa_and_aa_are_requested> ::= "2"

<ack_security> ::= <no_sec_is_requested> | <non_repudiation_sec_is_requested> | <macd
 _sec_is_requested> | <data_protected_sec_is_requested> |
 <non_repud_and_data_protected_sec_is_requested> | <non_repud_and_macd_sec_is_requested> |
 <macd_and_data_protected_sec_is_requested> | <macd_data_protected_and_non_repud_sec_is_req>

<no_sec_is_requested> ::= "0"
 <non_repudiation_sec_is_requested> ::= "1"
 <macd_sec_is_requested> ::= "2"
 <data_protected_sec_is_requested> ::= "3"
 <non_repud_and_data_protected_sec_is_requested> ::= "4"
 <non_repud_and_macd_sec_is_requested> ::= "5"
 <macd_and_data_protected_sec_is_requested> ::= "6"
 <macd_data_protected_and_non_repud_sec_is_req> ::= "7"

<send_acknowledgments_to>(04/18) ::= <fil_id_qualifier> <us> <fil_ack_recipient_id>
 -- identifies to whom a FI acknowledgment is to be addressed if other than the originator

<fil_id_qualifier> (02/02) ::= <inter_id_qualifier>
 <fil_ack_recipient_id> (01/15) ::= <string>

<ts_cross_references>(16/257) ::= <ts_ref_id> { <us> <ts_ref_id> } -- may be repeated up to six times

<type_of_financial_data>(01/02) ::= <x9_37> | <eccho> | <federal_reserve_cips_format>
 | <reserved_for_x9_use> | <private_formats>

<x9_37> ::= "1" -- DEFAULT
 <eccho> ::= "2"
 <federal_reserve_cips_format> ::= "3"
 <reserved_for_x9_use> ::= "4" | ... | "50"
 <private_formats> ::= "51" | ... | "99"

<count_of_financial_data_items>(01/08) ::= <numeric>

<count_of_imaged_items>(01/08) ::= <numeric>

<item_group_amount>(01/16) ::= <numeric>

<item_group_recipient_id>(04/18) ::= <send_acknowledgments_to>

<item_subgroup_count> (01/08) ::= <numeric>

-- Compression Algorithm Choices

<view_compression_algo_id>(01/03) ::= <filp_registered_algos>

<filp_registered_algos> ::= <uncompressed> | <t6_facsimile_compression> | <jpeg_baseline> | <jbig>
 | <abc> | <reserved_for_X9> | <private>

-- X9.46 Registered Compression algorithm identifiers

<uncompressed> ::= "1"
 <t6_facsimile_compression> ::= "2"
 <jpeg_baseline> ::= "3"
 <jbig> ::= "4"

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```

<general_Fli_extensions> ::= GFD <gs>
  <ts_length> <gs>
  <ts_ref_id> <gs>
  [ <type_of_ts_data> ] <gs>
  [ <recipient_ack_request> ] <gs>
  [ <send_acknowledgments_to> ] <gs>
  [ <ts_cross_references> ] <gs>
  - Following used in <financial_data_ts> only
  [ <type_of_financial_data> ] <gs>
  [ <count_of_financial_data_items> ] <gs>
  - Following used in <item_group_ts> only
  [ <count_of_imaged_items> ] <gs>
  [ <item_group_amount> ] <gs>
  [ <item_group_recipient_id> ] <gs>
  [ <item_subgroup_count> ] <tr>

<ts_length>(02/15) ::= <numeric>
<ts_ref_id>(16/42) ::= - provided for cross-referencing purposes
  <dg_data> "."
  <app_sender_id> "."
  <function_control_number> "."
  <trans_set_control_number>

<type_of_ts_data>(01/03) ::= <response_to_query> |
  <forward_processing> | <returns> | <positive_pay> | <account_recon> | <subpoena> | <signature_verify> |
  <statementing> | <mixed_type> | <reserved_for_x9> | <private_ts_type>

  <response_to_query> ::= "1"
  <forward_processing> ::= "2"
  <returns> ::= "3"
  <positive_pay> ::= "4"
  <account_recon> ::= "5"
  <subpoena> ::= "6"
  <signature_verify> ::= "7"
  <statementing> ::= "8"
  <mixed_type> ::= "9"
  <reserved_for_x9> ::= "10" | ... | "500"
  <private_ts_type> ::= "501" | ... | "999"

<recipient_ack_request>(01/04) ::= [ <ack_condition> ] <us> [ <type_of_request> ] <us> [ <ack_security> ]

<ack_condition>(01/01) ::= <ack_not_requested> | <ack_on_failure_or_success>
  | <ack_only_on_failure> | <ack_only_on_success>

  <ack_not_requested> ::= "0" - Overrides any value if present in <type_of_request>
  <ack_on_failure_or_success> ::= "1"
  <ack_only_on_failure> ::= "2" - DEFAULT
  <ack_only_on_success> ::= "3"

```

```

<no_of_included_sets> (01/06) ::= <numeric>
<no_of_received_sets> (01/06) ::= <numeric>
<no_of_accepted_sets> (01/06) ::= <numeric>
<fg_syntax_er_cd> (01/03) ::= <id>

-- END of IMPORTED FG, TS and Segment structures from X12

-- BEGIN definitive

-- SIGNATURE Transaction Set component data elements for signing
-- the entire contents of a functional group

<signature_ts> ::=
  <trans_set_header> -- the value of <trans_set_id> component is "STS"
    <signature_data>
      <signature> -- BIN-segment syntax
      <trans_set_trailer>

  <signature_data> ::= SIG <gs>
    <security_orig_name> <gs>
    <security_recip_name> <gs>
    <authent_algorithm_id> <gs>
    <key_and_or_block_size> <gs>
    [ <length_of_data> ] <tr>

  <authent_algorithm_id> (01/15) ::= <rsa_iso9796> | <dsa> | <identifier_string> { <identifier_string> }

    <rsa_iso9796> ::= <rsa_with_md5> | <rsa_with_sha-1> | <rsa_with_mdc2>
      -- from ISO/IEC 9796

    <rsa_with_md5> ::= "43.14.3.2.23"
    <rsa_with_sha-1> ::= "43.14.3.2.29"
    <rsa_with_mdc2> ::= "43.14.3.2.14"

    <dsa> ::= <dsa_with-sha-1>
    <dsa_with-sha-1> ::= "43.14.3.2.27"

  <key_and_or_block_size> (01/06) ::= <numeric>

-- END SIGNATURE Transaction Set

-- SIGNATURE segment

<signature> ::= <bin_segment>

-- END Signature Segment

-- User Data segment

<user_data> ::= <bin_segment>

-- END User Data Segment

-- FIIP General Functional Group Header Extensions Transaction Set

```


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```

<data_segment_note> ::= AK3 <gs>
  <segment_id_code> <gs>
  <seg_position_in_trans_set> <gs>
  [ <loop_id_code> ] - the value of the loop id of the subject loop being acknowledged {
  <gs><segment_syntax_er_cd> } <tr> - max 5 instances of error codes

<loop_id_code> ::= <loop_id>

<segment_id_code> (02/03) ::=
  <fg_security_header_segment> | <fg_security_trailer_segment> | <ts_security_header_segment> |
  <ts_security_trailer_segment> | <signature_data_segment> | <general_FFI_extensions_segment> |
  <item_subgroup_level> | <item_subgroup_information_seg> | <item_data_level> |
  <item_information_segment> | <item_view_level> | <item_view_data_segment> | <binary_data> |
  <application_ack_data_segment> | <query_request_data_segment> | <string>

  <fg_security_header_segment> ::= "S1S"
  <fg_security_trailer_segment> ::= "S1E"
  <ts_security_header_segment> ::= "S2S"
  <ts_security_trailer_segment> ::= "S2E"
  <signature_data_segment> ::= "SIG"
  <general_FFI_extensions_segment> ::= "GFD"
  <item_subgroup_level> ::= "LS1"
  <item_subgroup_information_seg> ::= "ISD"
  <item_data_level> ::= "LS2"
  <item_information_segment> ::= "IIH"
  <item_view_level> ::= "LS3"
  <item_view_data_segment> ::= "IVS"
  <binary_data> ::= "BIN"
  <application_ack_data_segment> ::= "ADS"
  <query_request_data_segment> ::= "QRD"

  -----
  <seg_position_in_trans_set> (01/06) ::= <numeric>

  <segment_syntax_er_cd> (01/03) ::= <dd>

  <data_element_note> ::= AK4 <gs>
    <el_position_in_segment> <gs>
    [ <data_element_ref_no> ] <gs>
    <element_syntax_er_cd> <gs>
    [ <value_of_bad_element> ] <tr>

  <el_position_in_segment> (01/02) ::= <numeric>

  <data_element_ref_no> (01/04) ::= <numeric>

  <element_syntax_er_cd> (01/03) ::= <dd>

  <value_of_bad_element> (01/99) ::= <string>

  <trans_set_response_trailer> ::= AK5 <gs>
    <trans_set_ack_code> { <gs> <trans_set_syntax_error_code> } <tr> - max 5 instances of additional note
    codes

  <trans_set_ack_code> (01/01) ::= <dd>

  <trans_set_note_codetrans_set_syntax_error_code> > (01/03) ::= <dd>

  <fg_response_trailer> ::= AK9 <gs>
    <functional_group_ack_code> <gs>
    <no_of_included_sets> <gs>
    <no_of_received_sets> <gs>
    <no_of_accepted_sets> { <gs> <fg_syntax_er_cd> } <tr> - max 5 instances of additional error codes

  <functional_group_ack_code> (01/01) ::= <dd>

```

<length_of_data> (01/18) ::= <numeric>
 <initialization_vector> (16/16) ::= <string>
 -- FG Security trailer
 <fg_security_trailer> ::= S1E <gs> <message_auth_code> <tr>
 <message_auth_code> (09/09) ::= <string>
 -- END Security functional group
 -- X12.58 SECURITY transaction set component data elements
 <ts_security> ::= S2S <gs> <security_SxS> <tr>
 <ts_security_trailer> ::= S2E <gs> <message_auth_code> <tr>
 -- END Security transaction set
 -- X12.58 SECURITY data elements
 -- End Security data elements
 -- X12 997- functional acknowledgment
 <functional_ack_fg> ::=
 <fg_header> -- the value of the component <functional_group_id> is "FA"
 <functional_transaction_set>
 <fg_trailer>

 <functional_transaction_set> ::=
 <trans_set_header> -- the value of the component <trans_set_id> is "997"
 <fg_response_header>
 { <trans_set_response_loop> } -- max 999,999 loop iterations
 <fg_response_trailer>
 <trans_set_trailer>
 <trans_set_response_loop> ::=
 <trans_set_response_header>
 { <data_segment_response_loop> } -- max 999,999 loop iterations
 <trans_set_response_trailer>
 <data_segment_response_loop> ::=
 <data_segment_note>
 { <data_element_note> } -- max 99 instances
 -- X12 997- segments
 <fg_response_header> ::= AK1 <gs>
 <functional_group_id> <gs> -- the value of the FG identifier of the subject FG being acknowledged
 <function_control_number> <tr>
 <trans_set_response_header> ::= AK2 <gs>
 <trans_set_id> <gs> -- the value of the TS identifier of the subject TS being acknowledged
 <trans_set_control_number> <tr>

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<loop_id> (01/04) ::= <string> | -- Only X9.46 registered values
 <item_subgroup_or_query_req> | <item_data> | <item_view>

-- X9.46 registered <loop_id> values

<item_subgroup_or_query_req> ::= "1"
 <item_data> ::= "2"
 <item_view> ::= "3"

-- X12.22 loop trailer definition

<loop_trailer> ::= LE <gs> <loop_id> <tr> -- the value is the loop-id value used in the
 corresponding LS segment

-- X12.58 SECURITY functional group component data elements

<lg_security> ::= S1S <gs>
 <security_SxS> <tr>

<security_SxS> ::=
 <security_type> <gs>
 <security_orig_name> <gs>
 <security_recip_name> <gs>
 [<authent_key_name>] <gs>
 [<authent_serv_code>] <gs>
 [<encryption_key_name>] <gs>
 [<encryption_serv_code>] <gs>
 [<length_of_data>] <gs>
 [<initialization_vector>]

<security_type> (02/02) ::= <id> |
 <authentication_only> | <authentication_and_data_protection> | <data_protection_only>

<authentication_only> ::= "AA"
 <authentication_and_data_protection> ::= "BB"
 | <data_protection_only> ::= "EE"

<security_orig_name> (04/16) ::= <string>

<security_recip_name> (04/16) ::= <string>

<authent_key_name> (01/16) ::= <string>

<authent_serv_code> (01/01) ::= <id> | <x9_9_binary_data> | <x9_17_std_value>

<x9_9_binary_data> ::= "1"
 <x9_17_std_value> ::= "2"

<encryption_key_name> (01/16) ::= <string>

<encryption_serv_code> (01/03) ::= <id> | <cbc_no_filter> | <cbc_hex_filter> | <cbc_ascii_filter> |
 <cbc_ascii_baudot_filter> | <cbc_mutually_defined_filter> | <cfb_8_no_filter> | <cfb_8_hex_filter> |
 <cfb_8_ascii_filter> | <cfb_8_ascii_baudot_filter>

<cbc_no_filter> ::= "20"
 <cbc_hex_filter> ::= "21"
 <cbc_ascii_filter> ::= "22"
 <cbc_ascii_baudot_filter> ::= "23"
 <cbc_mutually_defined_filter> ::= "2Z"
 <cfb_8_no_filter> ::= "40"
 <cfb_8_hex_filter> ::= "41"
 <cfb_8_ascii_filter> ::= "42"
 <cfb_8_ascii_baudot_filter> ::= "43"

<financial_data_group> ::= "70"
 <item_views_group> ::= "71"
 <application_ack_group> ::= "72"
 <query_requests_group> ::= "73"
 <functional_ack_group> ::= "FA" -- Imported from X12 - 997 functional acknowledgment
 <private_types> ::= "80" | ... | "99"
 <app_receiver_id> (02/15) ::= <string>
 <app_sender_id> (02/15) ::= <string>
 <fg_date> (06/06) ::= <date>
 <fg_time> (04/08) ::= <time> -- The originator's LOCAL time, not GMT
 <function_control_number> (01/09) ::= <numeric>
 <standard> (01/02) ::= <string>-- the value "X9" is used
 <version> (01/12) ::= <string>-- bytes 1-6: use the value "003050"
 -- bytes 7-12: use the values "001001"

– X12.6 functional group trailer definition

<fg_trailer> ::= GE <gs>
 <no_included_sets> <gs>
 <function_control_number> <tr> -- the value corresponds to value in its peer in the <fg_header>
 <no_included_sets> (01/06) ::= <numeric>

– X12.6 transaction set header definition

<trans_set_header> ::= ST <gs>
 <trans_set_id> <gs>
 <trans_set_control_number> <tr>

<trans_set_id> (03/03) ::= <string> | -- Only X9.46 registered values are used
 <financial_data_set> | <item_group_set> | <application_ack_set> | <query_requests_set> |
 <signatures_set> | <functional_ack_set>

– X9.46 <trans_set_id> registered <string> values

<financial_data_set> ::= "FTS"
 <item_group_set> ::= "ITS"
 <application_ack_set> ::= "ATS"
 <query_requests_set> ::= "QTS"
 <signatures_set> ::= "STS"
 <functional_ack_set> ::= "997" -- Imported from X12 - 997 functional acknowledgment

<trans_set_control_number>(04/09) ::= <string>

– X12.6 transaction set trailer definition

<trans_set_trailer> ::= SE <gs>
 <number_of_included_segments> <gs>
 <trans_set_control_number> <tr>-- the value corresponds to value in its peer in the <trans_set_header>
 <number_of_included_segments> (01/10)::= <numeric>

– X12.22 loop header definition

<loop_header> ::= LS <gs> <loop_id> <tr>

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<20th> ::= "19"
 <21st> ::= "20"

– Components of <time> data element 109 : X12.5

<time> ::= <hour><minute> [<seconds>]
 <hour> ::= "00" | "00" | ... | "23"
 <minute> ::= "00" | "00" | ... | "59"
 <seconds> ::= <integer_seconds> [<decimal_seconds>]
 <integer_seconds> ::= "01" | "02" | ... | "59"
 <decimal_seconds> ::= <digit> { <digit> }

– FIIP Routing Number Syntax

<routing_number>(09/09) ::= <numeric>

-- BEGIN IMPORTS FG, TS and Segment structures from X12 standards
 -- All are included for reference only - NOT DEFINITIVE.

-- X12.22 Bin Segment

<bin_segment> ::= BIN <gs>
 <length_of_binary_data> <gs>
 <binary_data> <tr>
 <length_of_binary_data> (01/15) ::= <unsigned_integer>
 <binary_data> (01/(10¹⁵ - 1)) ::= <binary>

– X12.6 standard's version Identifier syntax

<standard_version_id> (01/12) ::=
 <version> – The value for <version> is 003
 <release> – The value for <release> is 050
 <x9_version> – The value for <x9_version> is 001
 <x9_release> – The value for <x9_release> is 001
 <version> (03/03) ::= <numeric>
 <release> (03/03) ::= <numeric>
 <x9_version> (03/03) ::= <numeric>
 <x9_release> (03/03) ::= <numeric>

– X12.6 Functional Group Header Definition

<fg_header> ::= GS <gs>
 <functional_group_id> <gs>
 <app_sender_id> <gs>
 <app_receiver_id> <gs>
 <fg_date> <gs>
 <fg_time> <gs>
 <function_control_number> <gs>
 <standard> <gs>
 <version> <tr>
 <functional_group_id>(02/02) ::= <string> | -- X9.46 registered values only
 <financial_data_group> | <item_views_group> | <application_ack_group> |
 <query_requests_group> | <functional_ack_group> | <private_types>
 – X9.46 <functional_group_id> registered values only

– IMPORTS

<ack_requested>, <inter_date_time>, <inter_header>, <inter_trailer>, <inter_control>,
 <receiver>, <standard_version>, <security>, <sender>, <test_indicator>
 FROM ApplicationControlStructure { X12.5:1991 }

<binary>, <date>, <digit>, <decimal_number>, <lower_case_letter>, <numeric>, <space>, <special_char>,
 <string>, <time>, <uppercase_letter>, <unsigned_integer>, <other_special_char>, <national_char>
 FROM ApplicationControlStructure { X12.6:1991 };

BIN, GE, GS, LE, LS, SE, ST, S1E, S1S, S2E, S2S
 FROM SegmentDirectory { X12.22:1991 };

SxS
 FROM SecuritySegmentSpecification { X12.58:1991 };

*– BEGIN the Protocol**– Common encodings and grammar*

<string> ::= <non_space_char> | <space> { <non_space_char> | <space> }
 <character> ::= <uppercase_letter> | <digit> | <special_char> | <space> |
 <lower_case_letter> | <other_special_char> | <national_char>
 <non_space_char> ::= <uppercase_letter> | <digit> | <space> | <lower_case_letter> |
 <other_special_char> | <national_char>
 <us>(01/01) ::= <string> -- data element 115 : X12.5
 <decimal_number> ::= [+ | -] <unsigned_decimal_number>
 <unsigned_decimal_number> ::= <unsigned_integer> | "." <unsigned_integer> |

<unsigned_integer> "." { <digit> }
 <numeric> ::= [+ | -] <unsigned_integer>
 <unsigned_integer> ::= <digit> { <digit> }
 <id> ::= <letter_or_digit> { <letter_or_digit> } { <space> }
 <letter_or_digit> ::= <uppercase_letter> | <digit>
 <identifier_string> ::= <unsigned_integer> { "." <unsigned_integer> }
 <hex_string_char> ::= { <select_alpha_numerics> }
 <select_alpha_numerics> ::= <numeric> | <hex_alpha>
 <hex_alpha> ::= "A" | ... | "F"
 <units_of_measure> ::= <inch> | <centimeter>
 <inch> ::= "2" -- DEFAULT
 <centimeter> ::= "3"

– Components of <date> data element 108 : X12.5

<date> ::= <year> <month> <day>
 <year> ::= <digit> <digit>
 <month> ::= "01" | "02" | ... | "12"
 <day> ::= "01" | "02" | ... | "31"

– Components of <x9_date> element

<x9_date> ::= <century> <date>
 <century> ::= <20th> <21st>

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Annex A
(normative)

FIIS Interchange structure

This annex is provided to clarify the interchange data structures exchanged in accordance with this financial image interchange standard. The structures are restated using BNF in accordance with the conventions and concepts set forth in X12.5:1991 and X12.6:1991.

The BNF notation, contained in this annex, may be reproduced freely. All other aspects are covered by ANSI copyright infringement protection associated with this standard's publication.

This annex is divide into several areas (or groupings) which appear in the following order:

1. *Common Encodings and grammar*
 - 1.1 *Primitive encodings and grammar;*
 - 1.2 *X12.22 Imported common encodings;*
 - *Bin Segment and standard version syntax;*
 - *General Functional Group (FG) Header and Trailer;*
 - *General Transaction Set (TS) Header and Trailer;*
 - *Loop Header and Trailer;*
 - *Security FG and TS Header and Trailer.*
 - 1.3 *Signature TS and Segment;*
 - 1.4 *General FII Extensions for a TS*
2. *FIIP Interchange Structure*
 - 2.1 *X12.5 Imported Interchange Header and Trailer*
3. *Financial Data syntax for FG, TS and Segments*
4. *Items (views) syntax for FG, TS and Segments*
5. *Acknowledgments syntax for FG, TS and Segments*
6. *Query Requests syntax for FG, TS and Segments*

NOTE - The clause numbers used above indicate the sequence of their appearance.



fiis_interchange_syntax { X9.46 : 1995 }

BEGIN -- *FIIS Interchange syntax*

EXPORTS; *—everything*

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Additionally, an implementation of the FII shall declare the transfer means provided with its implementation, and whether supported optional elements of protocol are accessible by the FII-system-user through the FII-translator, and if the receiving FII-translator presents these elements of protocol to the FII-system-user.

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etc. A conformant implementation shall be able to demonstrate adherence to these requirements specified in these categories.

7.3.1 Static requirements

A FII-translator shall be said to *support* upon receipt a particular element of protocol if, and only if, it accepts, preserves, and emits, in full accord with this Standard, that particular element of protocol to the FII-system-user whenever it is called upon by another FII-translator.

A FII-translator shall be said to *support* upon origination a particular element of protocol if, and only if, it accepts, preserves, and emits, in full accord with this Standard, that particular element of protocol to another FII-translator whenever it is called upon by its FII-system-user.

A FII-translator shall satisfy the following static requirements:

- A claim of conformance shall state which conformance class its supports on origination and reception (see 7.2.). Base conformance class is Class I;
- A conformant FII-translator shall implement, for origination, all mandatory components of the EDI ISA/IEA Segments.. A conformant FII-translator shall implement, for origination, the FII functional groups, FII transaction sets, and FII data segments as defined in clause 6 per the class to which conformance is claimed. A conformant FII-translator shall implement, for origination, all mandatory components within the FII functional groups, FII transactions sets, and FII data segments for which conformance is claimed. Further, a conformant FII-translator may implement, for origination, optional components within the FII functional groups, FII transaction sets, and FII data segments for which conformance is claimed.
- For reception, a conformant FII-translator shall implement all mandatory components of the EDI ISA/IEA, and shall handle and make available (see 6.1.2) all optional and conditional components to the FII-system-user. Further, a conformant FII-translator shall implement for reception the FII functional groups, the FII transaction sets, and the FII data segments as defined in clause 6 as per the class to which conformance is claimed. A conformant FII-translator shall implement for reception all mandatory components of the EDI ISA/IEA, and shall handle and make available (see 6.1.2) all optional and conditional components to the FII-system-user.
- Class III and IV conformant FII-translators shall identify the specific security mechanisms and algorithms to which support is claimed;
- Each FII shall support the requirements of 6.2.2 through 6.4.4.3.28, inclusive;
- All conformant translators are expected to be tolerant of received protocol elements, even if support on origination or reception is not claimed.

7.3.2 Dynamic requirements

A FII-translator shall satisfy the dynamic requirements specified in clause 6:

- FII-translators claiming to be Class II or IV shall be able to demonstrate both successful and unsuccessful responses to query requests;
- A conformant FII-translator shall demonstrate the ability to generate the appropriate FII functional groups, FII transaction sets, and FII data segments as defined in sections 6.2.2 through 6.4.4.3.38, inclusive, in response to receipt of FII functional groups, FII transactions sets, and FII data elements,
- FII-translators claiming to be conformant shall emit conditional protocol elements when the condition is satisfied;
- Functional Acknowledgments shall be generated before Application Acknowledgments, when both are requested. FII translator, claiming conformance to Class II or IV, shall generate FII acknowledgments before responses to query requests.

7.1. General conformance matters

Conformance to protocol support, within protocol conformance class I, II, III, and IV, is demonstrated by:

- a. *Ability to assemble and disassemble data elements by functional groups and all subordinate levels;*
- b. *Ability to preserve syntax and semantics of the interchange between financial institutions.*

The concept of support is further refined in the Static Requirements clause of this standard.

7.2. Protocol conformance classes

There are four static protocol conformance classes. Each protocol conformance class specifies a set of functionality by functional group types as follows:

Table 56 - Conformance classes

Class	Functionality
I	Financial data Image views Functional acknowledgments Application acknowledgments
II	Financial data Image views Functional acknowledgments Application acknowledgments Query requests (and responses)
III	Financial data with security features Image views with security features Functional acknowledgments with security features Application acknowledgments with security features
IV	Financial data with security features Image views with security features Functional acknowledgments with security features Application acknowledgments with security features Query requests (and responses) with security features

7.3. Static and dynamic conformance requirements

Each entity claiming to conform to this standard shall identify the protocol conformance class (listed in table 56) to which protocol conformance is claimed.

The requirements for an implementation claiming to conform to this specification are classified into two categories: Static Requirement and Dynamic Requirements. Static requirements relate to the standardized FII structures to which conformance is claimed. Dynamic requirements relate the behavioral aspects of requirements set forth in this standard, e.g., circumstances related to generating notifications,

X9.46-1997**6.4.4.3.27. Restart point indicator**

The **<restart_point_indicator>** data element conveys a value which indicates to the receiver of a restart query request the point at which the previous query request, referenced in **<subject_ref_id>**, is to be restarted.

Size: 01/V

Type: AN

<restart_point_indicator>(01/V) ::= <string>

Value: see 6.1.4.3

Protocol support: Conditional, valid only if the **<query_request_type>** is restart request ("3").

Business usage: Conditional, shall be present if the **<query_request_type>** is restart request ("3").

6.4.4.3.28. Search user data present indicator

The Search Using User Data Segment Indicator **<search_using_user_data_segment>** element conveys an indication that a *user data* segment follows, which supplements the selection criteria specified in the query request data segment, and its content is to be used as part of the search criteria.

The *user data* selection criteria is carried in a User Data segment as defined in 6.4.2.6. The syntax and semantics of contents of the **<binary_data>** component of the User Data segment are outside the scope of this standard.

Size: 01/01

Type: N

<search_user_data_present_indicator>(01/01) ::= <sudpi_absent> | <sudpi_present>

<sudpi_absent> ::= "0" -- [DEFAULT]

<sudpi_present> ::= "1"

Values: "0" means "do not use user data" [DEFAULT];
"1" means "use user data".

Protocol support: Optional

Business usage: Conditional, shall be present only if specified in Banking Practices Agreement.

7. Conformance requirements

Conformance to this standard means that an implementation supports data elements as defined in this standard for the protocol conformance classes for which conformance is claimed. Support in this standard relates to the implementations ability to emit, package and preserve data as presented by the user application. Support is further refined into support on origination and support on reception of FIs on both static and dynamic levels

The fact that an implementation claims conformance to this standard does not in any way imply that it provides the functionality required by a specific image product, process, or environment.

Business usage: Conditional, shall be present only to specify a limit for a generic criterion.

6.4.4.3.26. Private locator range

The Private Locator Range **<private_locator_range>** element is used to tailor a search for imaged items matching a specific private (non-X9.46 defined) item locator identifier, or falling within a range of item locator identifiers. It comprises two subelements: **<private_locator_start>** and the **<private_locator_end>**. When both subelements are present, then the range end value shall be greater than, or equal, to the start value.

To search for imaged item(s), or item data, matching a specific item locator identifier, the same value shall be present in both **<private_locator_start>** and **<private_locator_end>**.

<private_locator_range> ::= [**<private_locator_start>**]**<us>**[**<private_locator_end>**]

<private_locator_start> (01/80) ::= **<string>**

<private_locator_end> (01/80) ::= **<string>**

Protocol support: Conditional, valid only when **<query_request_type>** is set to 2.

Business usage: Conditional, shall be present only to request a generic search on a specific value or range of values. and shall be present only if specified in Banking Practices Agreement

6.4.4.3.26.1. Private locator start

The Private Locator Start **<private_locator_start>** data element conveys a single value, or the low-end of a range of values, that is known by the originator to be an alternate "key" for locating the desired item's view(s). If a value is not specified, then there is no lower limit to anchor the search, i.e., the search will begin with the lowest value.

Size: 01/80

Type: AN

Values: User defined set of string characters. The absence implies that the range is unbounded at the lower limit.

Protocol support: Optional

Business usage: Conditional, shall be present only to specify a limit for a generic criterion.

6.4.4.3.26.2. Private locator end

The Private Locator End **<private_locator_end>** data element conveys the high-end of a range of values, that is privately known by the originator to be an alternate "key" for locating the desired item's view(s).

Size: 01/80

Type: AN

Values: User defined set of string characters. The absence implies that the range is unbounded at the upper end. It shall be equal to, or greater than, the value of Private Locator Start, when the Private Locator Start is present.

Protocol support: Optional.

Business usage: Conditional, shall be present only to specify a limit for a generic criterion..

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Values: Includes basic character set (6.1.3.1.), extended character set (6.1.3.2.) and special character set. When the Account Number Start is present, the value shall be equal to, or greater than, the value of Account Number Start..

Protocol support: Optional

Business usage: Conditional, shall be present only to specify a limit for a generic criterion..

6.4.4.3.25. Item serial number range

The Item Serial Number Range <item_serial_number_range> element is used to tailor a search for imaged items matching a specific item serial number, or falling within a range of serial numbers. It is comprised of two subelements: <item_serial_number_start> and <item_serial_number_end>. When both subelements are present, then the range end value shall be greater than, or equal to, the range start value.

To search for imaged item(s), or item data, matching a specific item serial number, the same value shall be present in both <item_serial_number_start> and <item_serial_number_end >.

<item_serial_number_range> ::= [<item_serial_number_start>
<us>[<item_serial_number_end>]

<item_serial_number_start> (01/10) ::= <string>
<item_serial_number_end> (01/10) ::= <string>

Protocol support: Conditional, valid only if the <query_request_type> is search request ("2").

Business usage: Conditional, shall be present only to request a generic search on a specific value or range of values..

6.4.4.3.25.1. Item serial number start

The Item Serial Number Start <item_serial_number_start> element conveys the low-end of a range of item serial number(s) to be used in the search. When used in conjunction with a Serial Number End, it shall be the beginning of a range of item serial numbers. If a value is not specified, then there is no lower limit to anchor the search, i.e., the search will begin zero.

Size: 01/10

Type: AN

Values: 0 through 9999999999

Protocol support: Optional

Business usage: Conditional, shall be present only to specify a limit for a generic criterion..

6.4.4.3.25.2. Item serial number end

The Item Serial Number End <item_serial_number_end> element conveys the high-end of a range of item serial numbers to be used in the search. The absence of a value for this element implies that the serial number of all items equal to, or greater than, the value of Serial Number Start shall be evaluated by the receiver's data base filtration process, as constrained by other values in this query request.

Size: 01/10

Type: AN

Values: 0 through 9999999999. It shall be equal to, or greater than, the value of Serial Number Start, when the Serial Number Start is present.

Protocol support: Optional

Size: 01/12

Type: N

Values: 0 through 999999999999 (in cents). It shall be equal to, or greater than, the value of Amount Start, when the Amount Start is present.

Protocol support: Optional

Business usage: Conditional, shall be present only to specify a limit for a generic criterion..

6.4.4.3.24. Account range

The Account Range `<account_number_range>` element is used to tailor a search for imaged items matching a specific item account, or falling within a range of accounts. It is comprised of two subelements: `<account_number_start>` and `<account_number_end>`. When both subelements are present, then the range end value shall be greater than, or equal to, the range start value.

To search for imaged item(s), or item data, matching a specific account number, the same value shall be present in both `<account_number_start>` and `<account_number_end>`.

`<account_number_range>` ::= [`<account_number_start>`]`<us>`[`<account_number_end>`]

`<account_number_start>` (01/18) ::= `<string>`

`<account_number_end>` (01/18) ::= `<string>`

Protocol support: Conditional, valid only if the `<query_request_type>` is search request ("2").

Business usage: Conditional, shall be present only to request a generic search on a specific value or range of values.

6.4.4.3.24.1. Account-number-start

The Account Number Start `<account_number_start>` element conveys the low-end of a range of account number(s) to be used in the search. If used with an end account number, it shall be the beginning of a range of account numbers. If a value is not specified, then there is no lower limit to anchor the search, i.e., the search will begin with the lowest value in the collating sequence defined by the character set in the exchange.

Size: 01/18

Type: AN

Values: Includes basic character set (6.1.3.1.), extended character set (6.1.3.2.) and special character set.

Protocol support: Optional

Business usage: Conditional, shall be present only to specify a limit for a generic criterion..

6.4.4.3.24.2. Account number end

The Account Number End `<account_number_end>` element conveys the high-end of a range of account numbers to be used in the search. The absence of a value for this element indicates that the account number of all items equal to, or greater than, the value of Account Number Start shall be evaluated by the receiver's data base filtration process, as constrained by other values in this query request.

Size: 01/18

Type: AN

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6.4.4.3.22.2. ECE cycle number end

The ECE Cycle Number End `<ece_cycle_number_end>` element conveys the high-end of a range for cycle numbers assigned to this item by the ECE institution. It is provided to convey the upper limit of the scope of search. The absence of a value for this element indicates that the cycle number of all items equal to, or greater than, the value of ECE Cycle Number Range Start shall be evaluated in by the receiver's data base filtration process, as constrained by other values in this query request.

Size: 01/02

Type: AN

Values: 00 through 99. It shall be equal to, or greater than, the value of ECE Cycle Number Start, when the ECE Cycle Number Start is present.

Protocol support: Optional

Business usage: Conditional, shall be present only to specify a limit for a generic criterion..

6.4.4.3.23. Amount range

The Amount Range `<amount_range>` element is used to tailor a search for imaged items matching a specific (dollar) amount, or falling within a range of amounts. It is comprised of two subelements: `<amount_start>` and `<amount_end>`. When both subelements are present, then the range end value shall be greater than, or equal to, the range start value.

To search for imaged item(s), or item data, matching a specific (dollar) amount, the same value shall be present in both `<amount_start>` and the `<amount_end>`.

`<amount_range>` ::= [`<amount_start>`]`<us>`[`<amount_end>`]

`<amount_start>` (01/12) ::= `<numeric>`

`<amount_end>` (01/12) ::= `<numeric>`

Protocol support: Conditional, valid only if the `<query_request_type>` is search request ("2").

Business usage: Conditional, shall be present only to request a generic search on a specific value or range of values..

6.4.4.3.23.1. Amount start

The Amount Start `<amount_start>` element conveys the low-end of a range for item amount(s). If used, it shall be the beginning of a range. If a value is not specified, then there is no lower limit to anchor the search, i.e., the search will begin with zero.

Size: 01/12

Type: N

Values: 0 through 999 999 999 999 (in cents)

Protocol support: Optional

Business usage: Conditional, shall be present only to specify a limit for a generic criterion..

6.4.4.3.23.2. Amount end

The Amount End `<amount_end>` element conveys the high-end of a range for item amounts. It is used only if requesting a range. It is provided to convey the upper limit (conveyed in cents) the scope of search. The absence of a value for this element indicates that the amount (dollar value) of all items equal to, or greater than, the value of Amount Range Start shall be evaluated by the receiver's data base filtration process, as constrained by other values in this query request.

6.4.4.3.21.2. ECE sequence number end

The ECE Sequence Number End `<ece_seq_number_end>` element conveys the high-end of a range for an item number assigned by the institution that created the ECE check detail record associated with an imaged item. The absence of a value for this element indicates that the ECE sequence number of all items equal to, or greater than, the value of ECE Sequence Number Start shall be evaluated by the receiver's data base filtration process, as constrained by other values in this query request.

Size: 01/15

Type: AN

Values: Characters from the set 0..9. It shall be equal to, or greater than, the value of ECE Sequence Number Start, when the ECE Sequence Number Start is present.

Protocol support: Optional

Business usage: Conditional, shall be present only to specify a limit for a generic criterion..

6.4.4.3.22. ECE cycle number range

The ECE Cycle Number Range `<ece_cycle_number_range>` element is used to tailor a search for imaged items matching a specific ECE cycle number, or falling within a range of ECE cycle numbers. It is comprised of two subelements: `<ece_cycle_number_start>` and `<ece_cycle_number_end>`. When both subelements are present, then the range end value shall be greater than, or equal to, the range start value.

To search for imaged item(s), or item data, matching a specific ECE cycle number, the same value shall be present in both `<ece_cycle_number_start>` and the `<ece_cycle_number_end>`.

`<ece_cycle_number_range> ::= [<ece_cycle_number_start>]`
`<us> [<ece_cycle_number_end>]`

`<ece_cycle_number_start> (01/02) ::= <string>`
`<ece_cycle_number_end> (01/02) ::= <string>`

Protocol support: Conditional, valid only if the `<query_request_type>` is search request ("2").

Business usage: Conditional, shall be present only to request a generic search on a specific value or range of values.

6.4.4.3.22.1. ECE Cycle number start

The ECE Cycle Number Start `<ece_cycle_number_start>` element conveys the low-end of a range of cycle numbers assigned to this item by the ECE institution. If used, it shall be the beginning of a range of cycle numbers. If a value is not specified, then there is no lower limit to anchor the search, i.e., the search will begin with zero.

Size: 01/02

Type: AN

Values: 00 through 99

Protocol support: Optional

Business usage: Conditional, shall be present only to specify a limit for a generic criterion..

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Protocol support: Optional

Business usage: Conditional, shall be present only to specify a limit for a generic criterion..

6.4.4.3.20.2. ECE business date end

The ECE Business Date End `<ece_business_date_end>` element conveys the high-end of a range of business date(s). It is used only if requesting a range. The absence of a value for this element indicates that the ECE business date of all items equal to, or greater than, the value of ECE Business Date Start shall be evaluated by the receiver's data base filtration process, as constrained by other values in this query request.

Size: 08/08

Type: AN

Values: See 6.4.2.8.2. It shall be equal to, or greater than, the value of ECE Business Date Start.

Protocol support: Optional

Business usage: Conditional, shall be present only to specify a limit for a generic criterion..

6.4.4.3.21. ECE sequence number range

The ECE Sequence Number Range `<ece_seq_number_range>` element is used to tailor a search for imaged items matching a specific ECE sequence number, or falling within a range of ECE sequence numbers. It is comprised of two subelements: a `<ece_seq_number_start>` and a `<ece_seq_number_end>`. When both subelements are present, then the range end value shall be greater than, or equal to, the range start value.

To search for imaged item(s), or item data, matching a specific ECE sequence number, the same value shall be present in both `<ece_seq_number_start>` and `<ece_seq_number_end>`.

```
<ece_seq_number_range> ::= [<ece_seq_number_start>]{<us>}{<ece_seq_number_end>}
  <ece_seq_number_start> (01/15) ::= <string>
  <ece_seq_number_end> (01/15) ::= <string>
```

Protocol support: Conditional, valid only if the `<query_request_type>` is search request ("2").

Business usage: Conditional, shall be present only to request a generic search on a specific value or range of values..

6.4.4.3.21.1. ECE sequence number start

The ECE Sequence Number Start `<ece_seq_number_start>` element conveys the low-end of a range of item numbers assigned by the institution that created the ECE check detail record associated with an imaged item. If used, it shall be the beginning of a range of sequence numbers. If a value is not specified, then there is no lower limit to anchor the search, i.e., the search will begin with 0000000000000000.

Size: 01/15

Type: AN

Values: Characters from the set 0..9.

Protocol support: Optional

Business usage: Conditional, shall be present only to specify a limit for a generic criterion..

<acceptable_compression_ids> ::= <view_compression_algo_id> { <us><view_compression_algo_id> }

Values: See 6.4.2.8.3..

Protocol support: Optional

Business usage: Conditional, shall be present only to override or supplement Banking Practices Agreement.

6.4.4.3.19. Payor bank routing number

The Payor Bank Routing Number **<payor_bank_rm>** element conveys the routing number to be used in the search criteria. If X9.37 is used, this is the Payor Bank Routing Number from the check detail record (type 25, field 4 and field 5 concatenated).

The absence indicates that the payor bank name is not used to limit the scope of the search request.

Size: 09/09

Type: N

<payor_bank_rm>(09/09) ::= <routing_number>

Values: 000000000 through 999999999

Protocol support: Optional

Business usage: Conditional, shall be present only to request a generic search on a specific value or range of values..

6.4.4.3.20. ECE business date range

The ECE Business Date Range **<ece_business_date_range>** element is used to tailor a search for imaged items matching a specific business date, or falling within a range of business dates. It is comprised of two subelements: the **<ece_business_date_start>** and the **<ece_business_date_end>**. When both subelements are present, then the range end value shall be greater than, or equal to, the range start value.

To search for imaged item(s), or item data, matching a specific ECE business date, the same value shall be present in both **<ece_business_date_start>** and the **<ece_business_date_end>**.

<ece_business_date_range> ::= [<ece_business_date_start>]<us>[<ece_business_date_end>]

<ece_business_date_start> (08/08) ::= <x9_date>

<ece_business_date_end> (08/08) ::= <x9_date>

Protocol support: Conditional, valid only if the **<query_request_type>** is search request ("2").

Business usage: Conditional, shall be present only to request a generic search on a specific value or range of values..

6.4.4.3.20.1. ECE business date start

The ECE **<ece_business_date_start>** element conveys the low-end of a range of business date(s). If used, the business date start shall be the beginning of a range of dates. If a value is not specified, then there is no lower limit to anchor the search, i.e., the search will begin with the earliest of the ECE business date known to the user.

Size: 08/08

Type: AN

Values: See 6.4.2.8.2.

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6.4.4.3.16. Maximum search lapse time

The Maximum Search Lapse Time `<max_lapse_time>` element conveys the originator's search (browse) lapse time constraint for this request. The lapse time is to be honored by the serving FI-translator and is expressed in minutes.

Should the lapse time expire before all the imaged items are found which match the selection criteria, the serving FI-translator shall return the views matching the criteria to the requestor, and indicate that more views are available if known, or indicate that more imaged items may exist that match the selection criteria, but the quantity is unknown.

Size: 01/06

Type: N

`<max_lapse_time>(01/06) ::= <numeric> -- expressed in seconds`

Values: User determined, 1 to 999999 seconds.

300 = 300 seconds [DEFAULT]

999999 = no maximum time limit specified

0 = not valid

Protocol support: Optional.

Business usage: Conditional, shall be present to override the 300 second default..

6.4.4.3.17. Maximum matching views requested

The Maximum Matching Views Requested `<max_matching_views_reqd>` element conveys an upper limit of the number of views requested in the subject query request.

If the number of views found matching the criteria exceeds this element's value, a negative acknowledgment shall be generated indicating the number of views found exceeds the upper limit in the associated request. The maximum number of views found shall be conveyed in an Item Views functional group and a negative acknowledgment shall be conveyed in an Application Acknowledgment functional group.

Size: 01/06

Type: N

`<max_matching_views_reqd>(01/06) ::= <numeric>`

Values: 0 through 999999

The value zero for this data element shall mean that ALL views matching the selection criteria are to be returned.

Protocol support: Optional

Business usage: Conditional, shall be present unless explicitly omitted in the Banking Practices Agreement

6.4.4.3.18. Acceptable compression Identifiers

The Acceptable Compression Ids `<acceptable_compression_ids>` element conveys the compression Ids which are acceptable for images returned in response to this request. If the receiver of this request is unable to satisfy it, the receiver shall send a negative Application Acknowledgment, if one was requested.

Size: 01/V

Type: AN

<frontal_view> ::= "0" -- DEFAULT
 <rear_view> ::= "1"
 <frontal_and_rear_view> ::= "2"

Values: 0 = frontal view [DEFAULT];
 1 = rear view;
 2 = both frontal and rear views.

Protocol support: Optional.

Business usage: Conditional, shall be present if the <query_request_type> is other than a cancel request ("0").

6.4.4.3.14. View snippet region

The View Snippet Region <view_snippet_region> element conveys the desired region of the item's image to be snipped. Either the <snippet_name> or <snippet_detail_info> shall be present. The <snippet_name> is defined in 6.4.2.8.14.1. The <snippet_detail_info> comprises three subelements: <snippet_origin>, <snippet_offset>, and <snippet_unit_of_measurement>. These subelements are defined in 6.4.2.8.14.2., 6.4.2.8.14.3., and 6.4.2.8.14.4., respectively.

Size: 01/31

Type: AN

<view_snippet_region>(01/31) ::= <snippet_name> | <snippet_detail_info>

See syntax and semantics in 6.4.2.8.14.

Protocol support: Conditional, valid only when <view_side_requested> is frontal view ("0") or rear view ("1").

Business usage: Conditional, shall be present when a snippet is requested..

6.4.4.3.15. Obsoletes query request identifier

The Obsoletes Query Request Identifier <obsoletes_query_request_id> element conveys the identity of either the transaction set, or the query request data segment that this query request obsoletes. The effect of issuing a query request containing this data element is that the named query request being obsoleted is canceled by the receiving FII-system-user, and any results returned will refer to the selection criteria specified in this query request.

If the value is a transaction set reference identifier, then the query request identifier shall be absent. Conversely, if the value is query request identifier, then the transaction set reference identifier shall be absent.

Size: 34/92

Type: N

<obsoletes_query_request_id>(34/92) ::= [<ts_ref_id>] [<us> <qrd_id>]

Values: See 6.3.2.2. for <ts_ref_id> and 6.4.4.3.2. for <qrd_id>

Protocol support: Optional.

Business usage: Conditional, shall be present to obsolete an outstanding query request..

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`<low>` ::= "1"
`<medium>` ::= "5"
`<high>` ::= "9"
`<user_defined_priority>` ::= "2" | "3" | "4" | "6" | "7" | "8"

Values: 1 = low priority;
 2,3,4 = reserved for private usage by financial institutions;
 5 = medium priority;
 6,7,8 = reserved for private usage by financial institutions;
 9 = high priority.

Protocol support: Conditional, valid only if the `<query_request_type>` is other than a cancel request ("0").

Business usage: Conditional, shall be present if the `<query_request_type>` is other than a cancel request ("0").

6.4.4.3.12. Retain custody indicator

The Retain Custody indicator `<retain_custody_indicator>` data element conveys the requirement of the originator that the FI-system-user, specified in `<fi_ack_recipient_id>`, either retain or pass the custody of the image.

Rules for custody are specified in regulations such as UCC, Federal Reserve regulations, clearing arrangements, or Banking Practices Agreement. The party who has custody of an image shall save the image and shall provide the image whenever requested, until such time as the rules for custody expire or the custody is passed. When rules for custody expire or custody is passed, this party no longer is required to provide the image when requested.

Size: 01/01

Type: N

`<retain_custody_indicator>(01/01) ::= <retain_custody> | <pass_custody>`

`<retain_custody>` ::= "0" - DEFAULT
`<pass_custody>` ::= "1"

Values: 0 = retain custody
 1 = pass custody

Protocol support: Conditional, valid only if the `<query_request_type>` is other than a cancel request ("0").

Business usage: Conditional, shall be present if the `<query_request_type>` is other than a cancel request ("0").

6.4.4.3.13. View side requested

The View Side Requested `<view_side_requested>` element conveys the requestor's desired orientation (i.e., side or view) for imaged items matching the selection criteria.

Size: 01/01

Type: N

`<view_side_requested>(01/01) ::= <frontal_view> | <rear_view> | <frontal_and_rear_view>`

Values: 0 = electronic format;
 1 = tape;
 2 = optical disk;
 3 = diskette;
 4 = paper copy of item;
 5 = original paper item;
 6 ... 799 = reserved for X9 use;
 800 ... 999 = reserved for private use.

Protocol support: Conditional, valid only if the <query_request_type> is other than a cancel request ("0").

Business usage: Conditional, shall be present if the <query_request_type> is other than a cancel request ("0").

6.4.4.3.10. Transport media requested

The Transport Media Requested <transport_media_requested> element conveys a value specifying how the results of a query are to be transported to the requested use.

Size: 01/02

Type: N

<transport_media_requested>(01/02) ::= <elec_com_link> | <hand_courier> | <overnight_mail> | <regular_mail> | <fax> | <private_transport> | <reserved_for_x9_trasp_media>

<elec_com_link> ::= "0" -- DEFAULT

<hand_courier> ::= "1"

<overnight_mail> ::= "2"

<regular_mail> ::= "3"

<fax> ::= "4"

<private_transport> ::= "5" | ... | "9"

<reserved_for_x9_trasp_media> ::= "10" | ... | "99"

Values: 0 = electronic communications [DEFAULT];

1 = hand courier;

2 = overnight mail;

3 = regular mail;

4 = fax;

5 ... 9 = private transport media;

10 ... 99 = reserved for X9 use.

Protocol support: Optional

Business usage: Conditional, shall be present if the <query_request_type> is other than a cancel request ("0").

6.4.4.3.11. Processing priority

The Processing Priority <processing_priority> element conveys desired importance that the originator has associated with this request. The receiving system's processing behavior associated with these values shall be defined in the Banking Practices Agreement.

Size: 01/01

Type: N

<processing_priority>(01/01) ::= <low> | <medium> | <high> | <user_defined_priority>

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- 11 means that the response shall be encrypted and Digitally Signed;
 21 means that the response shall be encrypted and MAC'ed.

Protocol support: Optional

Business usage: Conditional, shall be present only to specify or to convey security features or security mechanisms.

6.4.4.3.7. Retrieval image key

The Retrieval Image Keys <retrieval_image_key> element contains the value which represents the unique keys of the imaged item(s) to be retrieved. Its syntax and semantics are that of <image_key>, defined in 6.4.2.5.9.

Size: 34/V

Type: AN

<retrieval_image_key>(34/V) ::= <image_key>[<us><image_key>]

Value: 6.4.2.5.9

Protocol support: Conditional, valid only if the <query_request_type> is retrieve request ("1")

Business usage: Conditional, shall be present if the <query_request_type> is retrieve request ("1").

6.4.4.3.8. Scale size required

The Scale Size Required <scale_size_required> element conveys the required scaling factor that the originator has designated for images returned in accordance with this request.

Size: 01/03

Type: N

<scale_size_requested>(01/03) ::= <numeric> -- represents a percentage (%)

Values: 01 through 999

Protocol support: Conditional, valid only if the <query_request_type> is other than a cancel request ("0")

Business usage: Conditional, shall be present if the <query_request_type> is other than a cancel request ("0").

6.4.4.3.9. Response media

The Response Media <response_media> element contains a value indicating the physical type of media to be used to convey the results of a query request.

Size: 01/03

Type: N

<response_media>(01/03) ::= <electronic_format> | <tape> | <optical_disk> | <diskette> |
 <paper_copy_of_item> | <original_item> | <reserved_for_x9_media> | <user_defined_media>

<electronic_format> ::= "0" -- DEFAULT
 <tape> ::= "1"
 <optical_disk> ::= "2"
 <diskette> ::= "3"
 <paper_copy_of_item> ::= "4"
 <original_item> ::= "5"
 <reserved_for_x9_media> ::= "6" | ... | "799"
 <user_defined_media> ::= "800" | ... | "999"

<output_type_requested>(01/01) ::= <item_info_only> | <item_info_and_user_data> |
 <item_info_and_item_views> | <item_info_user_data_and_views> | <image_keys_only> |
 <views_of_item_only>

<item_info_only> ::= "0"
 <item_info_and_user_data> ::= "1"
 <item_info_and_item_views> ::= "2"
 <item_info_user_data_and_views> ::= "3"
 <image_keys_only> ::= "4"
 <views_of_item_only> ::= "5"

Values: 0 Item Information <item_information> only, i.e., no views;
 1 Item Information <item_information> and User Data <user_data> only, i.e., no views of
 imaged items;
 2 Item views <item_views> and corresponding Item Information <item_information> only,
 i.e., no User Data;
 3 Item views <item_views> and corresponding Item Information <item_information>, and
 User Data <user_data>;
 4 Image keys only;
 5 Item views <item_views> only (i.e., no item information).

Protocol support: Conditional, valid only if the <query_request_type> is other than a cancel request
 ("0").

Business usage: Conditional, shall be present if the <query_request_type> is other than a cancel
 request ("0").

6.4.4.3.6. Secured results request indicator

The Secured Results Request Indicator <secured_results_request_indicator> element conveys a value
 which indicates that the results of this request are to be protected by Data Protection, Non-Repudiation,
 or Authentication. Data Protection is to be provided by encrypting the results. Non-Repudiation is to be
 achieved by digitally signing the results, and Authentication is to be achieved by creating a MAC code.
 When present this indicator places a requirement upon the receiving FII-system-user.

If the receiving FII-system-user can not perform the requested security service, the request shall not be
 performed. If an Application Acknowledgment was requested, it shall convey that the receiving FII-
 system-user was unable to perform the request and indicate the appropriate diagnostic code. The choice
 of diagnostic code is dependent upon the local security policy of the receiving FII-system-user. This data
 element applies to both the Acknowledgment and the response to Query Request.

Size: 02/02

Type: N

<secured_results_request_indicator> (02/02) ::= <no_sec_reqd> | <digital_sign_only> | <macd_only> |
 <encryption_only> | <encryption_digital_sign_only> | <encryption_and_macd_only>

<no_sec_reqd> ::= "00" -- DEFAULT
 <digital_sign_only> ::= "10"
 <macd_only> ::= "20"
 <encryption_only> ::= "01"
 <encryption_digital_sign_only> ::= "11"
 <encryption_and_macd_only> ::= "21"

Values: 00 means no security services requested for the results [DEFAULT];
 10 means that the response shall be Digitally Signed only;
 20 means that the response shall be MAC'ed only;
 01 means that the response shall be encryption only;

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Business usage: Conditional, shall be present if the **<query_request_type>** is cancel request ("0") or restart request ("3").

6.4.4.3.4.1 Reference ID type

The Reference ID Type **<ref_id_type>** subelement value identifies the type of the reference ID included in the Subject Reference ID.

Size: 01/01

Type: N

```

<ref_id_type>(01/01) ::= <ts_ref_id> | <qrd_id> | <isd_ref_id> | <item_ref_id>
    <ts_ref_id>           ::= "0"
    <qrd_id>              ::= "1"
    <isd_ref_id>          ::= "2"
    <item_ref_id>         ::= "3"
  
```

Value: 0= Transaction Set Reference ID;
 1= Query Request ID;
 2= Item Subgroup Reference ID;
 3= Item Reference ID.

Protocol support: Conditional, valid only if the **<query_request_type>** is cancel request ("0") or restart request ("3").

Business usage: Conditional, shall be present if the **<query_request_type>** is cancel request ("0") or restart request ("3").

6.4.4.3.4.2 Reference ID value

The Reference ID value **<ref_id_value>** subelement contains the actual ID as identified by the Reference ID type.

Size: 20/58

Type: AN

```

<ref_id_value>(20/58)::= <ts_ref_id> | <qrd_id> | <isd_ref_id> | <item_ref_id>
  
```

Value: See 6.3.2.2 for **<ts_ref_id>**, 6.4.4.3.2 for **<qrd_id>**, 6.4.2.3.2 for **<isd_ref_id>**, and 6.4.2.5.2 for **<item_ref_id>**

Protocol support: Conditional, valid only if the **<query_request_type>** is cancel request ("0") or restart request ("3").

Business usage: Conditional, shall be present if the **<query_request_type>** is cancel request ("0") or restart request ("3").

6.4.4.3.5. Output type requested

The Output Type Required **<output_type_requested>** element contains a value which indicates the type of results required as the outcome from the FII-system-user satisfying a search request. The presence of this element depends upon the value for **<query_request_type>** being other than a cancel request ("0").

Size: 01/01

Type: N

Local Value: A numeric value created by the originator such that each item subgroup reference identifier in this transaction set shall have a unique value.

Protocol support: Mandatory

Business usage: Mandatory

6.4.4.3.3. Color indicator

The Color Indicator `<color_indicator>` element conveys a value which indicates that item views returned, matching the selection criteria, are to be returned as either black and white (BW), or gray-scale images.

Size: 01/02

Type: N

`<color_indicator>(01/02) ::= <bw_or_gray_scale> | <bw_only> |
<gray_scale_only> | <bw_and_gray_scale> | <x9_use> | <private_use>`

`<bw_or_gray_scale> ::= "0"`

`<bw_only> ::= "1"`

`<gray_scale_only> ::= "2"`

`<bw_and_gray_scale> ::= "3"`

`<x9_use> ::= "4" | ... | "50"`

`<private_use> ::= "51" | ... | "99"`

Values: 0 means either BW or gray scale;
1 means black and white only;
2 means gray scale only;
3 means both BW and gray-scale;
4 ... 50 reserved for X9 use;
51 ... 99 reserved for private use.

Protocol support: Conditional, valid only if the `<query_request_type>` is other than a cancel request ("0").

Business usage: Conditional, shall be present if the `<query_request_type>` is other than a cancel request ("0").

6.4.4.3.4. Subject reference ID

The Subject Reference ID value identifies the reference ID which is the subject of this request. The `<subject_ref_id>` comprises two subelements `<ref_id_type>` and `<ref_id_value>`.

Size: 22/60

Type: AN

`<subject_ref_id>(22/60) ::= <ref_id_type><us><ref_id_value>`

Values: See 6.3.2.2.

Protocol support: Conditional, valid only if the `<query_request_type>` is cancel request ("0") or restart request ("3").

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<acceptable_compression_ids> represent a data base "OR" operation. When taken together, the results of the request shall represent the mathematical *logical union* of both sets of data base operations.

"Start" indicates the beginning of a range, and end indicates the "end" of a range. If the start component is absent, the range starts at the lowest value. If a value for the "end" component is absent, the range terminates at the highest value. If a single value is desired, the value of the "start" and "end" components shall be identical. Restated in mathematical terms:

- "Start" conveys a value \geq the value associated with the requested items;
- "End" conveys a value \leq the value associated with the requested items.

6.4.4.3.1. Query request type

The Query Request Type **<query_request_type>** element conveys a value which indicates the type of Query Request contained in this segment. Four type of Query Requests are defined: Cancel Request, Retrieval Request, Search Request, and Restart Request.

Size: 01/02

Type: N

```

<query_request_type> (01/02) ::= <cancel_request> | <retrieval_request> | <search_request> |
<restart_request> | <reserved_for_X9_types> | <private_request_types>

<cancel_request>           ::= "0"
<retrieval_request>        ::= "1"
<search_request>           ::= "2"
<restart_request>          ::= "3"
<reserved_for_X9_types>    ::= "4" | ... | "50"
<private_request_types>    ::= "51" | ... | "99"

```

Values: 0 = Cancel request;
 1 = Retrieval request;
 2 = Search request;
 3 = Restart request;
 4 ... 50 = Reserved for X9 use;
 51 ... 99 = Privately agreed types of requests.

Protocol support: Mandatory

Business usage: Mandatory

6.4.4.3.2. Query request data identifier

The Query Request Data Identifier **<qrd_id>** element conveys a unique identifier assigned by the originator. It may be used by a receiving FII-system-user for acknowledgments, or audit and control purposes.

It is constructed by concatenating the value of **<ts_ref_id>**, and a locally determined numeric value. This value shall be unique to this transaction set.

Size: 18/50

Type: AN

```

<qrd_id> (18/50)           ::= <ts_ref_id> "." <local_value>

```

Values: Concatenation of these data elements:

Transaction set identifier (**<ts_ref_id>**) from 6.3.2.2.;

Table 55 - QRD: Query request data segment element names

QRD: Query request data segment element names	Size	Data type	Ref.	Protocol support	Business usage
<query_request_data>	-	-	[QRD]	-	-
<query_request_type>	01/02	N	-	M	M
<qrd_id>	18/50	AN	-	M	M
<subject_ref_id>	22/60	AN	-	C12	B29
<retrieval_image_key>	34/V	AN	-	C14	B31
<color_indicator>	01/02	N	-	C8	B28
<output_type_requested>	01/01	N	-	C8	B28
<secured_results_request_indicator>	02/02	N	-	O	B9
<scale_size_requested>	01/03	N	-	C8	B28
<response_media>	01/03	N	-	C8	B28
<transport_media_requested>	01/02	N	-	O	B28
<processing_priority>	01/01	N	-	C8	B28
<retain_custody_indicator>	01/01	N	-	C8	B28
<obsoletes_query_request_id>	34/92	AN	-	O	B33
<max_lapse_time>	01/06	N	-	O	B34
<max_matching_views_reqd>	01/06	N	-	O	B2
<view_side_requested>	01/01	N	-	O	B28
<view_snippet_region>	01/31	AN	-	C15	B32
<acceptable_compression_ids>	01/V	AN	-	O	B3
<payor_bank_m>	09/09	N	-	O	B35
<ece_business_date_range>	-	-	-	C13	B35
<ece_business_date_start>	08/08	N	-	O	B17
<ece_business_date_end>	08/08	N	-	O	B17
<ece_sequence_number_range>	-	-	-	C13	B35
<ece_seq_number_start>	01/15	AN	-	O	B17
<ece_seq_number_end>	01/15	AN	-	O	B17
<ece_cycle_number_range>	-	-	-	C13	B35
<ece_cycle_number_start>	01/02	AN	-	O	B17
<ece_cycle_number_end>	01/02	AN	-	O	B17
<amount_range>	-	-	-	C13	B35
<amount_start>	01/12	N	-	O	B17
<amount_end>	01/12	N	-	O	B17
<account_number_range>	-	-	-	C13	B35
<account_number_start>	01/18	AN	-	O	B17
<account_number_end>	01/18	AN	-	O	B17
<item_serial_number_range>	-	-	-	C13	B35
<item_serial_number_start>	01/10	AN	-	O	B17
<item_serial_number_end>	01/10	AN	-	O	B17
<private_locator_range>	-	-	-	C13	B35+B1
<private_locator_start>	01/80	AN	-	O	B17
<private_locator_end>	01/80	AN	-	O	B17
<restart_point_indicator>	01/V	AN	-	C16	B10
<search_user_data_present_indicator>	01/01	N	-	O	B1

Items matching the range selection criteria result from receiving FI-system-user "ANDing" the values when searching the local image and item information base. The values of multi-value data elements, like

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Table 54 - QRD: Query request data segment - element assignment

QRD: Query request data segment	Applicability by abstract operation			
	Cancel Request	Retrieval Request	Search Request	Restart Request
<query_request_data>	-	-	-	-
<query_request_type>	Y	Y	Y	Y
<qrd_id>	Y	Y	Y	Y
<subject_ref_id>	Y	-	-	Y
<retrieval_image_key>	-	Y	-	-
<color_indicator>	-	Y	Y	-
<output_type_requested>	-	Y	Y	Y
<secured_results_request_indicator>	-	Y	Y	-
<scale_size_requested>	-	Y	Y	-
<response_media>	-	Y	Y	Y
<transport_media_requested>	-	Y	Y	Y
<processing_priority>	-	Y	Y	Y
<retain_custody_indicator>	-	Y	Y	-
<obsoletes_query_request_id>	-	Y	Y	-
<max_lapse_time>	-	Y	Y	Y
<max_matching_views_reqd>	-	Y	Y	Y
<view_side_requested>	-	Y	Y	-
<view_snippet_region>	-	Y	Y	-
<acceptable_compression_ids>	-	Y	Y	-
<payor_bank_no>	-	-	Y	-
<ece_business_date_range>	-	-	Y	-
<ece_sequence_number_range>	-	-	Y	-
<ece_cycle_number_range>	-	-	Y	-
<amount_range>	-	-	Y	-
<account_number_range>	-	-	Y	-
<item_serial_number_range>	-	-	Y	-
<private_locator_range>	-	-	Y	-
<restart_point_indicator>	-	-	-	Y
<search_user_data_present_indicator>	-	-	Y	-

Y - the data element applies

- Restart: The ability to restart a query which exceeded specified constraints.

Table 54 identifies the applicability for mandatory and optional data elements of the Query Request Data segment as they apply to these four operations.

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- f. One or more Query Request Data *<query_request_loop>* structures which contain elements corresponding to one query, cancel, or restart operation per iteration of the internal loop. The data segment's contents may cover a request for a specific imaged item, or a group of imaged items, which all satisfy the retrieval or search criteria, a request to cancel an outstanding query request, transaction set, or functional group, or a request to restart a query which exceeded specified constraints;
- g. Conditionally, one Transaction Set Security Trailer *<ts_security_trailer>* is the standard security trailer which indicates the bounds of the *<ts_security_header>*. It may contain a MAC code, if that was the form of authentication applied to this transaction set. Its syntax is defined in 6.3.1.10;
- h. One Transaction Set Trailer *<trans_set_trailer>* which identifies the end of this transaction set, its syntax is as defined in X12.22 to be a GE segment, and included in this standard in 6.3.1.2.

6.4.4.2. Query request loop

The *<query_request_loop>* segment enables the exchange of standardized query request selection criteria and non-standard, privately agreed, user defined selection criteria. Each instance of the loop in the interchange shall be evaluated on its own merit. The syntax of this loop shall be structured as specified in table 53.

Protocol support: Mandatory

Business usage: Mandatory

Table 53 - Query request loop element names

Query request loop element names	Size	Data type	Ref.	Protocol support	Business support
<i><query_request_loop></i> ¹⁾	—	—	—	—	—
<i><loop_header></i>	—	—	LS	M	M
<i><query_request_data></i>	—	—	[ORD]	M	M
<i><user_data></i>	—	—	BIN	O	B1
<i><loop_trailer></i>	—	—	LE	M	M

1) 10,000 maximum loop iteration

The components of each instance of an Item Subgroup loop are as follows:

- One Loop Header *<loop_header>* segment defined in 6.3.1.5. The value of *<loop_id>* shall be "1";
- One Query request *<query_request_data>* segment. Its syntax is defined in 6.4.2.5;
- Optionally, one User Data *<user_data>*, whose syntax is defined in 6.4.2.6. A User Data segment is an alias for a Bin Segment. It is provided to carry a privately agreed stream of data. It conveys a bi-laterally agreed formatted contents for Query Requests functions whose syntax, and semantics, are outside of the scope of this standard;
- One Loop Trailer *<loop_trailer>* segment defined in 6.3.1.6. The value of *<loop_id>* shall be "1"

6.4.4.3. Query request data segment

The *<query request data>* segment supports four functions:

- Cancel: The ability to cancel an outstanding query request, transaction set, or functional group;
- Retrieval: The ability to specify a named image, item or a list of specifically named image items for retrieval;
- Search: The ability to search for imaged items, which meet specified selection criteria;

6.4.4.1. Query requests transaction set

The Query Requests transaction set <query_requests_ts> structure provides for the following requests:

- Retrieval of one or more imaged items based on an image key, or list of image keys (<retrieval_request>);
- Retrieval of one or more imaged items based on user defined selection criteria (<search_request>);
- Cancel an outstanding query search request, query retrieval request, or previously sent transaction set of either financial data or item views (<cancel_request>);
- Restart a previous query search request, or query retrieval request which has been terminated because of constraints exceeded (<restart_request>).

Protocol support: Mandatory

Business usage: Mandatory

Table 52 - Query requests transaction set element names

Query requests transaction set element names	Size	Data type	Ref.	Protocol support	Business support
<query_requests_ts>	—	—	—	—	—
<trans_set_header>	—	—	ST	M	M
<ts_security_header>	—	—	S2S	O	B9
<signature_data>	—	—	[SIG]	O	B9
<signature>	—	—	BIN	C6	B9
<general_FII_extensions>	—	—	[GFD]	M	M
<query_request_loop> ¹	—	—	—	M	M
<ts_security_trailer>	—	—	S2E	C1	B9
<trans_set_trailer>	—	—	SE	M	M

1 - Maximum loop iterations are 10,000

Each Query Request Transaction Set <query_request_ts> comprises the following structures:

- One Transaction Set Header <trans_set_header> is an envelope structure compliant with X12.22 standard, GS, and is defined in this standard in 6.3.1.1. The value of the <trans_set_id> component of <trans_set_header> shall be "QTS", indicating that the transaction set contains one, or more, specific query requests;*
- Optionally, one Transaction Set Security Header <ts_security_header> which conveys information about the data protection, or simple authentication mechanisms, applied to the transaction set. It is used for verifying the integrity of the transaction set's contents, or for decrypt the transaction set's encrypted contents. The security group is defined in 6.3.1.9;*
- Optionally, one Signature Data <signature_data> segment which conveys information about the digital signature applied to this transaction set, as created by the originating financial institution. When present, it enables the receiving FII-translator, or FII-system-user, to reconstitute the digital signature to verify its authenticity, or to detect if the transaction set contents were altered in transit. Its syntax is defined in 6.3.1.13.2;*
- Conditionally, one Signature <signature> segment which conveys the actual digital signature identified in <signature_data>. Its syntax is a BIN segment which is specified in 6.3.1.11;*
- One General FII Extensions <general_FII_extensions> segment, whose syntax is defined in 6.3.2 of this specification;*

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Restart requests provide a means to request that a previous terminated query request be restarted at the point of termination.

The Query Request function may be constrained by supplying service control instructions in the request. The control instructions may include the scope, or run-time, that the user expects the receiver to respect when processing a specific search request.

The functional group shall contain at least one instance of `<query_requests_ts>`. However, if the `<test_indicator>` in the ISA header is set to TRUE, including `<query_requests_ts>` is optional.

The syntax of the `<query_requests_fg>` shall be as specified in the following table.

Table 51 - Query requests FG element names

Query requests FG element names	Size	Data type	Ref.	Protocol support	Business usage
<code><query_requests_fg></code>	—	—	—	—	—
<code><fg_header></code>	—	—	GS	M	M
<code><fg_security_header></code>	—	—	S1S	O	B9
<code><signature_ts></code>	—	—	—	O	B9
<code><query_requests_ts></code>	—	—	—	M	M
<code><fg_security_trailer></code>	—	—	S1E	C1	B9
<code><fg_trailer></code>	—	—	GE	M	M

Each Query Requests functional Group `<query_requests_fg>` comprises the following structures:

- a. *One Functional Group Header `<fg_header>` structure identifies the functional group, and is defined in 6.3.1.1. The value of `<functional_group_id>` component of `<fg_header>` shall be "73" to indicate that this functional group contains one or more Query Request transaction sets;*
- b. *Optionally, one Functional Group Security Header `<fg_security_header>` structure which conveys mechanisms which provide simple authentication services to verify the contents of the entire functional group's originator, or to identify the method of data protection applied to the contents of the functional group. The Functional Group Security Header is defined in 6.3.1.7;*
- c. *Optionally, one signature transaction set `<signature_ts>` structure which provides a mechanism to apply strong authentication to the transaction set's contents. This structure conveys a digital signature applied to this transaction set's contents as created by the originating financial institution, and information on how the signature was created. When present, the signature enables a receiving FI-system-user to authenticate the source of the signed data. Its syntax is defined in 6.3.1.13.1;*
- d. *One or more Query Requests Transaction Set `<query_requests_ts>` structures which contains elements corresponding to one or more query, or cancel operations. Each instance of its contents conveys a request for a specific imaged object item, or a group of items, meeting the selection criteria, or a request that an outstanding Query Request be canceled. There may be one or more query request transaction sets conveyed in a single Query Requests functional group. Each instance of a query Cancel Request shall contain a request to cancel a single outstanding Query Request. The transaction set may only be absent when the functional group is included in a test interchange;*
- e. *Conditionally, one Functional Group Security Trailer `<fg_security_trailer>` is the standard security trailer, as specified in X12.22 and X12.58. Its syntax is defined in 6.3.1.8;*
- f. *One Functional Group Trailer `<fg_trailer>` identifies the end this functional group. Its syntax is as defined in X12.22 to be a GE segment, and included in this Standard in 6.3.1.2.*

Protocol support: Conditional, valid only when the acknowledgement is in response to a query request other than Query Cancel Request ("0").

Business usage: Conditional, shall be present unless explicitly omitted in the Banking Practices Agreement.

6.4.3.1.13. Restart point indicator

The `<restart_point_indicator>` data element is generated by the originator of the Application Acknowledgment and contains a value which indicates the point at which the previous query request, referenced in `<subject_ref_id>`, is to be restarted.

Size: 01/V

Type: AN

`<restart_point_indicator>(01/V) ::= <string>`

Values: see 6.1.4.3..

Protocol support: Conditional, valid only if `<application_ack_diagnostic_code>` indicates that constraints have been exceeded ("8").

Business usage: Conditional, shall be present unless explicitly omitted in the Banking Practices Agreement.

6.4.4. Query requests functional group

The Query Requests functional group supports a request for item data and images associated with an item. This information is to be used by the receiver to identify requested images held in its local data and image store, or to cancel outstanding query request(s) or previously sent transaction set.

Four types of Query Requests functions are distinguished:

a) cancel request:

A cancel request provides a means of specifying the sender's request to cancel an outstanding query request by specifying the transaction set identifier of the outstanding query request;

b) retrieve request: retrieve a specific imaged item(s) request

A Query retrieve request provides a means to request item information, user data or views of a specific imaged item by specifying its image keys. Multiple keys may be included to request multiple items. The results corresponding to the named imaged item(s) are returned to the requestor in an Item Views functional group. ;

c) general search: general search request that returns images or item data for all items found matching a set of selection criteria:

General search requests provide a means to request a search and retrieve based on the logical "AND"ing of the element values specified. If the requestor wants to specify element values in an "OR" relationship, multiple query request data segments are used. Selection criteria may be performed:

- by item: a search request indicating that only a list of image keys is requested causes an acknowledgment to be returned that contains a listing (and count) of the imaged item keys that satisfy the selection criteria, not the images themselves.
- by name of item: a search request indicating that imaged items, or item data, or user data is to be retrieved, causes the Item Views functional group to be generated for those imaged items that meet the specified selection criteria.

d) restart: restart a previous query request which had been terminated because some of the specified constraints were exceeded.

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Type: AN

<subject_qrd_id>(18/50) ::= <qr_id> to acknowledge at the query request level

Values: See 6.4.4.3.2.

Protocol support: Conditional, present only if requested to be acknowledged at the this level. If used, either the <subject_ts_ref_id>, <subject_isd_ref_id>, <subject_item_ref_id>, <subject_item_view_id>, or <subject_qrd_id>, shall be present. The presence of more than one of these shall be considered a protocol violation..

Business usage: Conditional, shall be present only if specified in BPA, and then shall be subject to the type of acknowledgment requested..

6.4.3.1.10. Number items matching criteria

The Number Items Matching Criteria <number_items_matching_criteria> element conveys the number of imaged item views that were found matching the query request's search selection criteria.

Size: 01/06

Type: N

<number_items_matching_criteria>(01/06) ::= <numeric>

Values: 0 through 9999999.

Protocol support: valid only when the acknowledgement is in response to a query request other than Query Cancel Request ("0").

Business usage: Conditional, shall be present unless explicitly omitted in the Banking Practices Agreement.

6.4.3.1.11. Supplementary information

The Supplementary Information <supplemental_info> element further amplifies the application acknowledgment diagnostic codes. It could convey the value of the sub-view's compression-id parameter that the receiving FI-translator can not accept, or advise a list of acceptable compression-ids.

Size: 01/80

Type: AN

<supplemental_info>(01/80) ::= <string>

Values: User defined

Protocol support: Optional.

Business usage: Conditional, shall be present only if specified in Banking Practices Agreement.

6.4.3.1.12. Image keys matching criteria

The Image Keys Matching Criteria <image_keys_matching_criteria> element conveys the unique names (image keys) of imaged items that were found matching the query request's list selection criteria.

Size: 34/V

Type: AN

<image_keys_matching_criteria>(34/V) ::= <image_key> { <us><image_key> }

Values: See 6.4.2.5.9

Protocol support: Conditional, present only if requested to be acknowledged at the this level. If used, either the `<subject_ts_ref_id>`, `<subject_isd_ref_id>`, `<subject_item_ref_id>`, `<subject_item_view_id>`, or `<subject_qrd_id>`, shall be present. The presence of more than one of these shall be considered a protocol violation..

Business usage: Conditional, shall be present only if specified in BPA, and then shall be subject to the type of acknowledgment requested..

6.4.3.1.7. Subject Item reference identifier

The Subject Item Reference Identifier `<subject_item_ref_id>` element conveys the unique identifier that was assigned to the collection of views associated with a single subject item to which this acknowledgment refers.

The syntax of `<subject_item_ref_id>` is that of `<item_ref_id>` defined in 6.4.2.5.2 of this specification.

Size: 20/58

Type: AN

`<subject_item_ref_id>(20/58) ::= <item_ref_id>- to acknowledge at the imaged item level`

Values: See 6.4.2.5.2

Protocol support: Conditional, present only if requested to be acknowledged at the this level. If used, either the `<subject_ts_ref_id>`, `<subject_isd_ref_id>`, `<subject_item_ref_id>`, `<subject_item_view_id>`, or `<subject_qrd_id>`, shall be present. The presence of more than one of these shall be considered a protocol violation..

Business usage: Conditional, shall be present only if specified in BPA, and then shall be subject to the type of acknowledgment requested..

6.4.3.1.8. Subject Item-view reference identifier

The Subject Item View Reference Identifier `<subject_item_view_id>` element conveys the unique identifier that has been assigned to the subject view (of an item) to which this acknowledgment refers.

The syntax of `<subject_item_view_id>` is that of `<item_view_id>` which is defined in 6.4.2.8.1. of this specification.

Size: 22/66

Type: AN

`<subject_item_view_id>(22/66) ::= <item_view_id>- to acknowledge at the item view level`

Values: See 6.4.2.8.1.

Protocol support: Conditional, present only if requested to be acknowledged at the this level. If used, either the `<subject_ts_ref_id>`, `<subject_isd_ref_id>`, `<subject_item_ref_id>`, `<subject_item_view_id>`, or `<subject_qrd_id>`, shall be present. The presence of more than one of these shall be considered a protocol violation..

Business usage: Conditional, shall be present only if specified in BPA, and then shall be subject to the type of acknowledgment requested..

6.4.3.1.9. Subject query request identifier

The Subject Query Request Identifier `<subject_qrd_id>` element conveys the unique identifier that has been assigned to the subject query request, to which this acknowledgment refers.

The syntax of `<subject_qrd_id>` is that of `<qrd_id>` which is defined in 6.4.4.3.2. of this specification.

Size: 18/50

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<out_of_balance> ::= "6"
 <arrived_too_late> ::= "7"
 <constraints_exceeded> ::= "8"
 <unwilling_to_perform> ::= "9"
 <cdc_reserved_for_X9_use> ::= "10"|"..."|"499"
 <user_defined_diagnostic_codes> ::= "500"|"..."|"999"

Values: 0= no error;
 1 = security failure;
 2 = Protocol violation;
 3 = Banking Practices Agreement violation;
 4 = Unable to locate;
 5 = Image format error;
 6 = out of balance;
 7 = arrived to late;
 8 = constraints exceeded;
 9 = unwilling to perform;
 10 ... 499 = reserved for X9 use;
 500 ... 999 = user defined diagnostic codes.

Protocol support: Mandatory

Business usage: Mandatory

6.4.3.1.5. Subject transaction set reference identifier

The Subject Transaction Set Reference Identifier <subject_ts_ref_id>, element conveys the unique identifier that was assigned to the subject transaction set to which this acknowledgment refers.

The syntax of <subject_ts_ref_id> is that of <ts_ref_id>, which is defined in 6.3.2.2. of this specification.

Size: 16/42

Type: AN

<subject_ts_ref_id>(16/42) ::= <ts_ref_id> - to acknowledge at the transaction set level

Values: see 6.3.2.2.

Protocol support: Conditional, present only if requested to be acknowledged at the this level. If used, either the <subject_ts_ref_id>, <subject_isd_ref_id>, <subject_item_ref_id>, <subject_item_view_id>, or <subject_qrd_id>, shall be present. The presence of more than one of these shall be considered a protocol violation..

Business usage: Conditional, shall be present only if specified in BPA, and then shall be subject to the type of acknowledgment requested..

6.4.3.1.6. Subject item subgroup reference identifier

The Subject Item Subgroup Information Reference Identifier <subject_isd_ref_id> element conveys the unique identifier that was assigned to a group of items, to which this acknowledgment refers.

The syntax of <subject_isd_ref_id> is that of <isd_ref_id>, defined in 6.4.2.3.2. of this specification.

Size: 18/50

Type: AN

<subject_isd_ref_id>(18/50) ::= <isd_ref_id> - to acknowledge at the group of items level

Values: See 6.4.2.3.2.

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<application_ack_created_date_time>(15/15) ::= <x9_date><us><time> -- time is constrained to HHMMSS

Values: YYYYMMDD<us>HHMMSS Date and time acknowledgment was created

Protocol support: Mandatory

Business usage: Mandatory

6.4.3.1.3. Application acknowledgment reason code

The Application Acknowledgment Reason Code <application_ack_reason_code> element conveys the reason code assigned by the originator of this acknowledgment. The reason may be further clarified by using the <application_ack_diagnostic_code> field.

Size: 01/01

Type: N

<application_ack_reason_code>(01/01) ::= <accepted> |
<results_of_a_list_request> | <rejected_referenced_ts> | <failure_of_operation>

<accepted>	::= "0"
<results_of_a_list_request>	::= "1"
<rejected_referenced_ts>	::= "2"
<failure_of_operation>	::= "3"

Values: 0 Accepted referenced functional group, transaction set, item, or view;
1 Results of a list request;
2 Rejected referenced functional group, transaction set, item, or view;
3 Failure of operation.

Protocol support: Mandatory

Business usage: Mandatory

6.4.3.1.4.

Application acknowledgment diagnostic code

The Application Acknowledgment Diagnostic Code <application_ack_diagnostic_code> element conveys a diagnostic code that further clarifies the reason code value found in the <application_ack_reason_code> field.

Size: 01/03

Type: N

<application_ack_diagnostic_code>(01/03) ::=
<no_error> | <security_failure> | <protocol_violation> |
<bpa_violation> | <unable_to_locate> | <image_format_error> | <out_of_balance> |
<arrived_too_late> | <constraints_exceeded> | <unwilling_to_perform> | <dc_reserved_for_X9_use> |
<user_defined_diagnostic_codes>

<no_error>	::= "0" -- for reason code = <accepted> only
<security_failure>	::= "1"
<protocol_violation>	::= "2"
<bpa_violation>	::= "3"
<unable_to_locate>	::= "4"
<image_format_error>	::= "5"
<out_of_balance>	::= "6"

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- One Transaction Set Header <trans_set_header> segment, whose syntax is defined in 6.3.1.3. The value of <trans_set_id> shall be "ATS" and it indicates that this is an application acknowledgment transaction set;
- Optionally, one Transaction Set Security Header <ts_security_header> segment, whose syntax is defined in 6.3.1.7;
- Optionally, one Signature Data <signature_data> segment, whose syntax is defined in 6.3.1.13.2;
- Conditionally, one Signature <signature> segment, whose syntax is defined in 6.3.1.11;
- One General FII Extensions <general_fii_extensions> segment whose syntax is defined in 6.3.2;
- One or more, Acknowledgment Data Segment <application_ack_data> segment;
- Conditionally, one Transaction Set Security Trailer <ts_security_trailer> segment, whose syntax is defined in 6.3.1.10;
- One Functional Group Trailer <trans_set_trailer>, whose syntax is defined in 6.3.1.4

6.4.3.1.1 Application acknowledgment Data

The application acknowledgment data (<application_ack_data>) provides the actual acknowledgment details. Acknowledgment may be either positive or negative. In the case of negative acknowledgments, a diagnostic code shall be provided. This segment shall also be used to convey the number of views that were found meeting the originator's selection criteria for a Query Request: Search operational request.

Protocol support: Mandatory

Business usage: Mandatory

Table 50 - ADS: Application acknowledgment data segment element names

ADS: Application acknowledgment data element names	Size	Data type	Ref.	Protocol support	Business usage
<application_ack_data>	—	—	[ADS]	—	—
<application_ack_created_date_time>	15/15	AN	—	M	M
<application_ack_reason_code>	01/01	N	—	M	M
<application_ack_diagnostic_code>	01/03	N	—	M	M
<subject_ts_ref_id>	16/42	AN	—	C7	B30
<subject_isd_ref_id>	18/50	AN	—	C7	B30
<subject_item_ref_id>	20/58	AN	—	C7	B30
<subject_item_view_id>	22/66	AN	—	C7	B30
<subject_qrd_id>	18/50	AN	—	C7	B30
<number_items_matching_criteria>	01/06	N	—	C22	B2
<supplemental_info>	01/80	AN	—	O	B1
<image_keys_matching_criteria>	34/V	AN	—	C22	B2
<restart_point_indicator>	01/V	AN	—	C17	B2

6.4.3.1.2 Application acknowledgment created date and time

The Application Acknowledgment Created Date And Time <application_ack_created_date_time> element conveys the business date and time of the creation of this acknowledgment.

Size: 15/15

Type: AN

Table 48 - Application acknowledgment functional group element names

Application Acknowledgment FG element names	Size	Data type	Ref.	Protocol support	Business usage
<application_ack_fg>	—	—	—	—	—
<fg_header>	—	—	GS	M	M
<fg_security_header>	—	—	S1S	O	B9
<signature_ts>	—	—	—	O	B9
<application_ack_ts>	—	—	—	M	M
<fg_security_trailer>	—	—	S1E	C1	B9
<fg_trailer>	—	—	GE	M	M

The Application Acknowledgment Functional Group is composed of the following elements:

- One Functional Group Header <fg_header>, defined in 6.3.1.1; The value of <functional_group_id> shall be "72", indicating that it is an Application Acknowledgment Functional Group;
- Optionally, one Functional Group Security Header <fg_security_header>, defined in 6.3.1.7;
- Optionally, one Signature Transaction Set <signature_ts>, defined in 6.3.1.13.1;
- One or more Application Acknowledgment Transaction Set <application_ack_ts>;
- Optionally, one Functional Group Security Trailer <fg_security_trailer>, defined in 6.3.1.8;
- One Functional Group Trailer <fg_trailer>, defined in 6.3.1.2.

6.4.3.1. Application acknowledgment transaction set

The Application Acknowledgment Transaction Set (<application_ack_ts>) provides the FII-system-user's actual acceptance, or rejection, of the interchange contents. An Application Acknowledgment may be either positive or negative. In the case of negative acknowledgments, a diagnostic code shall be provided. In the case of positive acknowledgments, this transaction set also shall be used to convey the number (and optional list) of views that were found meeting the originator's selection criteria for a Query Request: Retrieve (only) Keys operational request.

Protocol support: Mandatory

Business usage: Mandatory

Table 49 - Application Acknowledgment transaction set element names

Application Acknowledgment transaction set element names	Size	Data type	Ref.	Protocol support	Business usage
<application_ack_ts>	—	—	—	—	—
<trans_set_header>	—	—	ST	M	M
<trans_security_header>	—	—	S2S	O	B9
<signature_data>	—	—	[SIG]	O	B9
<signature>	—	—	BIN	C6	B9
<general_FII_extensions>	—	—	[GFD]	M	M
<application_ack_data>	—	—	[ADS]	M	M
<ts_security_trailer>	—	—	S2E	C1	B9
<trans_set_trailer>	—	—	GE	M	M

The components of the application acknowledgment transaction set are as follows:

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<view_description>(01/32) ::= <string>

Values: User determined, composed of printable string characters.

Protocol support: Optional

Business usage: Conditional, shall be present only if specified in Banking Practices Agreement.

6.4.2.8.19. Scanner manufacturer name

The Scanner Manufacturer Name **<scanner_mfgr_name>** element conveys the name of the manufacturer of the scanner system.

Size: 01/30

Type: AN

<scanner_mfgr_name>(01/30) ::= <string>

Values: User determined, composed of printable string characters.

Protocol support: Optional

Business usage: Conditional, shall be present only if specified in Banking Practices Agreement.

6.4.2.8.20. Scanner model name

The Scanner Model Name **<scanner_model_name>** element conveys the model name and number of the scanner.

Size: 01/15

Type: AN

<scanner_model_name>(01/15) ::= <string>

Values: User determined, composed of printable string characters.

Protocol support: Optional

Business usage: Conditional, shall be present only if specified in Banking Practices Agreement.

6.4.2.8.21. View capture software

The Image Capture Software Identifier **<view_capture_software>** element conveys the name and release of software package that created the view.

Size: 01/30

Type: AN

<view_capture_software_id>(01/30) ::= <string>

Values: User determined, composed of printable string characters.

Protocol support: Optional

Business usage: Conditional, shall be present only if specified in Banking Practices Agreement.

6.4.3. Application acknowledgment functional group

An Application Acknowledgment Functional Group **<application_ack_fg>** is the information object exchanged between financial institutions to signal acceptance of responsibility for an FII. It is defined to be a single data structure. The elements of the data structure identify the reference interchange and other relevant descriptive information, and an acceptance/reject code.

The Application Acknowledgment Functional Group is returned as DEFAULT for negative conditions and when requested by the originator of the subject interchange.

<embedded_header_indicator>(01/03) ::= <spiff> | <ansi_alim_oda> | <tiff_6> | <loca_fs_11> | <reserved_for_x9> | <private_use>

<spiff>	::= "0"
<ansi_alim_oda>	::= "1"
<tiff_6>	::= "2"
<loca_fs_11>	::= "3"
<reserved_for_x9>	::= "4" | ... | "499"
<private_use>	::= "500" | ... | "999"

Values: 0 = Still Picture Interchange File Format

1 = ANSI/ALIM ODA MS-53

2 = TIFF 6.0

3 = IOCA Function Set 11

4 - 499 = Reserved for X9

500 - 999 = reserved for private use (see Banking Practices Agreement); will not be used by X9.

Protocol support: Mandatory

Business usage: Mandatory

6.4.2.8.16.2 View raster data offset

The View Raster Data Offset element conveys the number of bytes that precede the image raster data that is carried in the BIN segment. The View Raster Data Offset element shall correspond to the **<embedded_header_indicator>**.

Size: 01/08

Type: N

<view_raster_data_offset>(01/08) ::= <numeric>

Values: 0 through 99999999.

Protocol support: Mandatory

Business usage: Mandatory

6.4.2.8.17. Creation computer

The Creation Computer **<creation_computer>** element conveys the system name of the originator's host computer that was used to create and digitize the imaging data.

Size: 01/32

Type: AN

<creation_computer>(01/32) ::= <string>

Values: User determined, composed of printable string characters.

Protocol support: Optional

Business usage: Conditional, shall be present only if specified in Banking Practices Agreement.

6.4.2.8.18. View description

The View Description **<view_description>** element conveys the originator's comment, or title, related to the imaged item.

Size: 01/32

Type: AN

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Figure 15 - Illustration of the clipping concept

Size: 04/43 (for each sub-component, i.e., offset value)

Type: AN

<clipping_offset>(04/43)::= [<h1>] <us> [<h2>] <us> [<v1>] <us> [<v2>]

<h1>(01/10) ::= <numeric> - Measured in PIXELs - DEFAULT = 1

<h2>(01/10) ::= <numeric> - Measured in PIXELs - DEFAULT = view's maximum horizontal dimension

<v1>(01/10) ::= <numeric> - Measured in PIXELs - DEFAULT = 1

<v2>(01/10) ::= <numeric> - Measured in PIXELs - DEFAULT = view's maximum vertical dimension

Subelement Values: <h1>, <h2>, <v1>, <v2>, at least one shall be present.

<h1> is less than <h2>

<v1> is less than <v2>

Absence of a subelement implies that the corresponding value is defaulted in accordance with the following default table:

<h1> = 1 [DEFAULT];

<h2> = view's maximum horizontal dimension;

<v1> = 1 [DEFAULT];

<v2> = view's maximum vertical dimension.

The default value for <h2> and <v2> is determined by the either <pixel_per_lines> or <number_of_lines> depending upon the value of <orientation> defined in 6.4.2.8.6, 6.4.2.8.7 and 6.4.2.8.13 respectively. When the <orientation> is 1 through 4 then the default value for <h2> is the value of <pixel_per_lines> otherwise it is the value of <number_of_lines>. When the <orientation> is 1 through 4, then the default value for <v2> is the value of <number_of_lines>, otherwise it is the value of <pixel_per_lines>.

Protocol support: Optional.

Business usage: Conditional, shall be present when <clipping_info> are conveyed..

6.4.2.8.16 Embedded header information

Embedded Header Information conveys two pieces of information: the <embedded_header_indicator> and <view_raster_data_offset>. The absence of the Embedded Header Information shall be understood to mean that an embedded header is not present.

<embedded_header_info> ::= <embedded_header_indicator><us><view_raster_data_offset>

Protocol support: Optional

Business usage: Conditional, shall be present only if specified in Banking Practices Agreement

6.4.2.8.16.1 Embedded header indicator

The Embedded Header Indicator <embedded_header_indicator> element conveys an indication that non-raster information is carried in a section of the BIN segment's <binary> component. When present, an embedded header shall precede the raster data. The value set for this element and the value of <view_raster_data_offset> shall correspond.

Size: 01/03

Type: N

Type: N

```

<clipping_origin>(01/01) ::= <top_right_corner_of_imaged_item> |
<top_left_corner_of_imaged_item> | <bottom_right_corner_of_imaged_item> |
<bottom_left_corner_of_imaged_item>

<top_right_corner_of_imaged_item> ::= "1"
<top_left_corner_of_imaged_item>  ::= "2"
<bottom_right_corner_of_imaged_item> ::= "3"
<bottom_left_corner_of_imaged_item> ::= "4"

```

Values: 1 = top right corner
 2 = top left corner
 3 = bottom right corner
 4 = bottom left corner

Note - Top, bottom, left, and right apply to a view which presents a visually correct orientation.

Protocol support: Optional.

Business usage: Conditional, shall be present when <clipping_info> are conveyed..

6.4.2.8.15.2. Clipping offset

The Clipping Offset <clipping_offset> compound element contains four subelements which convey the clipping rectangle's offsets in both horizontal (h) and vertical (v) directions relative to that corner pixel of the view defined by the <clipping_origin> element. The value of each offset is expressed in units of pixels and is a positive number (positive X and Y values include the center of the reference object). The offset values collectively establish the bounding sides of the clipping rectangle.

Pixels on the boundary of the clipping rectangle are included in the selected array of pixels. That is, the first pixel of the selected array is at offset (h_1 , v_1) and the last pixel of the selected array is at offset (h_2 , v_2).

The corner pixel at the origin of the full item view is assumed to have an offset value of (1,1). Thus, the pixel diagonally adjacent to the corner pixel has an offset value of (2,2).

The following figure illustrates the concept (using <clipping_origin> = 1 as an example). In this figure the entire object is represented by dots. The shaded portion identifies the region of interest and the unshaded portion identifies the portion to be ignored.

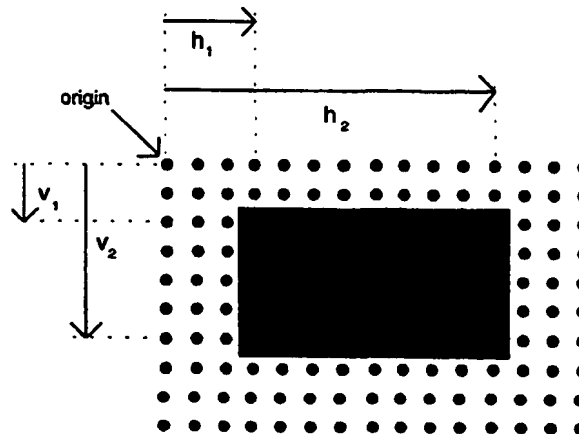


Figure 15 - Illustration of the clipping concept

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$\langle \alpha 1_offset \rangle (01/06)$::= $\langle decimal_number \rangle$
 $\langle \alpha 2_offset \rangle (01/06)$::= $\langle decimal_number \rangle$
 $\langle y1_offset \rangle (01/06)$::= $\langle decimal_number \rangle$
 $\langle y2_offset \rangle (01/06)$::= $\langle decimal_number \rangle$

Values: $\langle \alpha 1_offset \rangle$, $\langle \alpha 2_offset \rangle$, $\langle y1_offset \rangle$, $\langle y2_offset \rangle$ which may be either a positive integer or a positive decimal number.

Protocol support: Conditional, valid only in a Item Group Transaction Set.

Business usage: Conditional, shall be present if necessary to identify properly the snippet.

6.4.2.8.14.4. Snippet units of measure

The Snippet Units Of Measure $\langle snippet_units_of_measure \rangle$ subelement conveys the metrics of the snippet's offset coordinates. The metrics shall be expressed in terms of *inches* or *centimeters*.

Size: 01/01

Type: N

$\langle snippet_units_of_measure \rangle$::= $\langle units_of_measure \rangle$

Values: 2 means inch [DEFAULT];
3 means centimeter.

Protocol support: Optional.

Business usage: Conditional, shall be present unless explicitly omitted in the Banking Practices Agreement.

6.4.2.8.15. Clipping Information

Clipping Information $\langle clipping_information \rangle$ defines a rectangular array within the item view that contains the pixels corresponding to the region of interest for the physical item. The clipping is comprised of two subelements: $\langle clipping_origin \rangle$ and $\langle clipping_offset \rangle$. The unit of measure for the clipping offset are pixels.

This compound element is to be used when the portion of the view that corresponds to the physical item is not equivalent to the full frame of the view (i.e. is defined by a rectangular array of pixels within the full view). This clipping technique differs from snippet in that the full image is presented.

The $\langle clipping_offset \rangle$ is a compound data subelement with subelements $\langle h_1 \rangle$, $\langle h_2 \rangle$, $\langle v_1 \rangle$, and $\langle v_2 \rangle$.

The clipping parameters are used to display or print the portion of the view that corresponds to the physical item.

$\langle clipping_info \rangle (02/45)$::= [$\langle clipping_origin \rangle$] $\langle us \rangle$ [$\langle clipping_offset \rangle$]

Protocol support: Optional.

Business Usage: Conditional, shall be present when $\langle clipping_info \rangle$ are conveyed..

6.4.2.8.15.1. Clipping origin

The Clipping Origin $\langle clipping_origin \rangle$ element conveys the corner of the full view to which the $\langle clipping_offset \rangle$ data applies. Top, bottom, left, and right apply to a view which presents a visually correct orientation.

Size: 01/01

`<snippet_origin>(01/01) ::= <top_right_corner_of_snippet> | <top_left_corner_of_snippet> |
 <bottom_right_corner_of_snippet> | <bottom_left_corner_of_snippet>`

`<top_right_corner_of_snippet> ::= "1"
 <top_left_corner_of_snippet> ::= "2"
 <bottom_right_corner_of_snippet> ::= "3"
 <bottom_left_corner_of_snippet> ::= "4"`

Values: 1 = top right corner
 2 = top left corner
 3 = bottom right corner
 4 = bottom left corner

Protocol support: Conditional, valid only if both snippet origin and offset are used.

Business usage: Conditional, shall be present if necessary to identify properly the snippet..

6.4.2.8.14.3. Snippet offset

The Snippet Offset `<snippet_offset>` element conveys the snippet's offset in both the X and Y coordinate direction, as related to the value of the `<snippet_origin>` element of protocol. The value of each coordinate is expressed in terms of *inches* or *centimeters* as expressed in the Snippet Unit of measurement. The reference edge shall be determined from the value of `<snippet_origin>`. The offset value (positive X and Y values include the center of the reference object) and shall not exceed six characters in length, including an embedded decimal point, when present.

The following figure illustrates the concept. In this figure the snippet area is represented by dots.

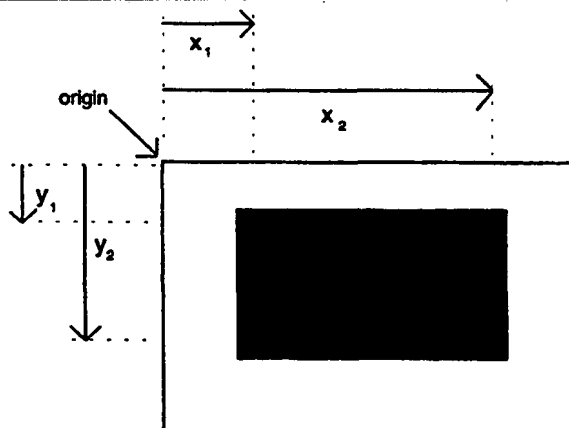


Figure 14 - Illustration of the snippet concept

Size: 07/27

Type: AN (each offset is type R)

`<snippet_offset>(07/27) ::= <x1_offset> <us> <x2_offset> <us> <y1_offset> <us> <y2_offset>`

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Business usage: Conditional, shall be present if necessary to identify properly the snippet.

6.4.2.8.14.1. Snippet name

The Snippet Name <snippet_name> element conveys the functional description of the snippet view contained in this detail segment, i.e., the named snippet region of the item

Size: 01/02

Type: N

```

<snippet_name>(01/02) ::= <courtesy_amount> | <payee_name> | <payor_name> | <micr_code_line> |
<signature> | <date_from_item> | <legal_amount> | <payee_endorsement> | <bofd_endorsement> |
<subsequent_bank_endorsement> | <subsequent_bank_name> | <reserved_for_x9_snippet_use> |
<reserved_for_private_snippet_use> | <name_not_provided>

<name_not_provided>      ::= "0"
<courtesy_amount>        ::= "1"
<payee_name>              ::= "2"
<payor_name>              ::= "3"
<micr_code_line>          ::= "4"
<signature>              ::= "5"
<date_from_item>          ::= "6"
<legal_amount>            ::= "7"
<payee_endorsement>      ::= "8"
<bofd_endorsement>        ::= "9"
<subsequent_bank_endorsement> ::= "10"
<subsequent_bank_name>    ::= "11"

<reserved_for_x9_snippet_use> ::= "12" | ... | "49"
<reserved_for_private_snippet_use> ::= "50" | ... | "99"

```

Values: 0 = name not provided

1 = courtesy amount

2 = payee name

3 = payor name

4 = MICR code line

5 = signature

6 = date from item

7 = legal amount

8 = payee endorsement

9 = bofd endorsement

10 = subsequent bank endorsement

11 = bank name

12 through 49 = reserved for X9 use.

50...99 = reserved for private use (as defined in the Banking Practices Agreement), and will not be used by X9.

Protocol support: Conditional, valid only if snippets are used.

Business usage: Conditional, shall be present if necessary to identify properly the snippet...

6.4.2.8.14.2. Snippet origin

The Snippet Origin <snippet_origin> element conveys the corner of the item to which the snippet's x and y off-sets relate in this detail segment.

Size: 01/01

Type: N

Business usage: Mandatory

6.4.2.8.13. Orientation (of view)

The <orientation> data element describes the orientation of the bitmap with respect to the physical item. The orientation data element allows users to present the bit map pixel in the proper sequence to archive visually a correct viewing of the displayed or printed image.

Size: 01/01

Type: N

<orientation>(01/01) ::= <dr_tb> | <rl_tb> | <rl_bb> | <dr_bb> | <tb_lr> | <tb_rl> | <bt_rl> | <bt_lr>

<dr_tb>	::= "1" -- DEFAULT
<rl_tb>	::= "2"
<rl_bb>	::= "3"
<dr_bb>	::= "4"
<tb_lr>	::= "5"
<tb_rl>	::= "6"
<bt_rl>	::= "7"
<bt_lr>	::= "8"

- Values: 1 = The successive pixels constituting the first line were taken from **left to right** at the **topmost** edge of the imaged item. Successive lines progress from **top to bottom** [Default]
- 2 = The successive pixels constituting the first line were taken from **right to left** at the **top most** edge of the imaged item. Successive lines progress from **top to bottom**.
- 3 = The successive pixels constituting the first line were taken from **right to left** at the **bottom-most** edge of the imaged item. Successive lines progress from **bottom to top**.
- 4 = The successive pixels constituting the first line were taken from **left to right** at the **bottom-most** edge of the imaged item. Successive lines progress from **bottom to top**.
- 5 = The successive pixels constituting the first line were taken from **top to bottom** at the **left-most** edge of the imaged item. Successive lines progress from **left to right**.
- 6 = The successive pixels constituting the first line were taken from **top to bottom** at the **rightmost** edge of the imaged item. Successive lines progress from **right to left**.
- 7 = The successive pixels constituting the first line were taken from **bottom to top** at the **right-most** edge of the imaged item. Successive lines progress from **right to left**.
- 8 = The successive pixels constituting the first line were taken from **bottom to top** at the **left-most** edge of the imaged item. Successive lines progress from **left to right**.

Protocol support: Optional

Business usage: Conditional, shall be present unless explicitly omitted in the Banking Practices Agreement.

6.4.2.8.14. Snippet Information

The Snippet Information <snippet_info> element conveys the identity of the region of interest for a specific imaged object that is associated with this data. It is composed of 4 subelements: Snippet Name, snippet Origin, Snippet Offset, and Snippet Unit of Measure.

The absence shall be understood to mean full view is present. The presence of this data element shall mean a snippet (partial view) is present.

The term top, bottom, left, and right apply to a view which presents a visually correct orientation.

<snippet_info>(01/31) ::= [<snippet_name>] <us>
 [<snippet_origin> <us>
 <snippet_offset> <us>
 [<snippet_units_of_measure>]] -- ABSENCE assumed to be INCH unless stated otherwise

Protocol support: Optional

X9.46-1997**6.4.2.8.10. Resolution across lines**

The Resolution Across Lines **<resolution_across_lines>** element specifies the number of encoded lines per resolution unit.

Size: 01/08

Type: N

<resolution_across_line>(01/08) ::= <numeric>

Values: 1 through 99999999

Protocol support: Mandatory

Business usage: Mandatory

6.4.2.8.11. Bits per pixel

The Bits Per Pixel **<bits-per-pixel>** element conveys the number of bits required to represent each sample associated with a pixel (indicates the number of levels captured at source). See annex B for specific requirements on bit ordering and padding.

Size: 01/01

Type: N

<bits_per_pixel>(01/01) ::= <one> | <two> | <four> | <six> | <eight>

<one>	::= "1"	– black and white
<two>	::= "2"	– gray scale
<four>	::= "4"	– gray scale
<six>	::= "6"	– gray scale
<eight>	::= "8"	– gray scale

Values: 1 = Black and white;
 2 = 2 bits per pixel gray scale;
 4 = 4 bits per pixel gray scale;
 6 = 6 bits per pixel gray scale;
 8 = 8 bits per pixel gray scale.

Protocol support: Mandatory

Business usage: Mandatory

6.4.2.8.12. Interpret bitmap

The Interpret Bitmap **<interpret_bitmap>** element describes how to interpret actual values in the bitmap for discovering whether the minimum sample value should be understood to mean white or black.

Size: 01/01

Type: N

<interpret_bitmap>(01/01) ::= <min_pixel_value_is_white> | <min_pixel_value_is_black>

<min_pixel_value_is_white>	::= "0"
<min_pixel_value_is_black>	::= "1"

Values: 0 minimum sample value should be output as white, and the maximum sample value should be output as black;
 1 minimum sample value should be output as black, and the maximum sample value should be output as white;

Protocol support: Mandatory

6.4.2.8.7. Number of lines

The Number of Lines **<number_of_lines>** data element specifies the number of encoded lines in the image. The relationship between pixels in these encoded lines and corresponding points on the physical item depends on the **<orientation>** data element values.

As an example, if the encoding is organized according to the standard viewing organization (**<orientation>=1**), the first pixel in each line would have been taken from top to bottom at the leftmost edge of the imaged item.

The physical distance between successive lines is governed by the parameter **<resolution_across_lines>**.

Size: 01/08

Type: N

<number_of_lines>(01/08) ::= <numeric>

Values: 1 through 99999999

Protocol support: Mandatory

Business usage: Mandatory

6.4.2.8.8. Resolution unit

The Resolution Unit **<resolution_unit>** element specifies the unit used by the elements of protocol: **<resolution_along_line>**, **<resolution_across_lines>**, and **<snippet_offset>**. The absence of this element of protocol shall be understood to mean inch.

Size: 01/01

Type: N

<resolution_unit>(01/01) ::= <none> | <inch> | <centimeter>

<none> ::= "1"

<inch> ::= "2" -- DEFAULT

<centimeter> ::= "3"

Values: 1 no unit of resolution;
2 inch [DEFAULT];
3 centimeter.

Protocol support: Optional.

Business usage: Conditional, shall be present unless explicitly omitted in the Banking Practices Agreement.

6.4.2.8.9. Resolution along line

The Resolution Along Lines **<resolution_along_line>** data element specifies the number of pixels per resolution unit along an encoded raster line.

Size: 01/08

Type: N

<resolution_along_line>(01/08) ::= <numeric>

Values: 1 through 99999999

Protocol support: Mandatory

Business usage: Mandatory

X9.46-1997**6.4.2.8.4. View raster data size**

The View Raster Data Size `<view_raster_data_size>` element conveys the size in bytes within `<binary_data>` component of the BIN segment. This size is the size of the raster data only, and does not include the size of any embedded header.

Size: 01/10

Type: N

`<view_raster_data_size>` (01/10) ::= `<numeric>`

Values: 0 through 9999999999

Protocol support: Mandatory

Business usage: Mandatory

6.4.2.8.5. View side indicator

The View Side Indicator `<view_side_indicator>` element conveys the type of the view contained in this detail segment.

Size: 01/01

Type: N

`<view_side_indicator>` (01/01) ::= `<frontal>` | `<rear>`

`<frontal>` ::= "0" -- DEFAULT

`<rear>` ::= "1"

Values: 0 = frontal view [DEFAULT]

1 = rear view

Protocol support: Optional

Business usage: Conditional, shall be present unless explicitly omitted in the Banking Practices Agreement

6.4.2.8.6. Pixels per line

The Pixels per line `<pixels_per_line>` data element specifies the number of pixels in an encoded raster line. These pixels may have come from any of the possible orientation directions along the physical item, but constitute a "line" for encoding purposes.

An example, if the encoding is organized according to the standard viewing organization (`<orientation>`=1), the successive pixels constituting the first line would have been taken from left to right at the topmost edge of the imaged item.

The physical distance between successive pixels along a line is governed by the parameter `<resolution_along_line>`.

Size: 01/08

Type: N

`<pixels_per_line>` (01/08) ::= `<numeric>`

Values: 1 through 99999999

Protocol support: Mandatory

Business usage: Mandatory

Business usage: Conditional, shall be present only if specified in Banking Practices Agreement

6.4.2.8.2. View creation date

The View Creation Date <view_creation_date> element conveys the date of the view's creation by the image capture equipment.

Size: 08/08

Type: N

<view_creation_date>(08/08) ::= <X9_data>

<view_raster_data_size> (01/10) ::= <numeric>

Values: YYYYMMDD where YYYY is the year, MM is the month, and DD is the day.

YYYY is 0000 through 9999

MM is 01 through 12

DD is 01 through 31

Protocol support: Mandatory

Business usage: Mandatory

6.4.2.8.3. View compression algorithm identifier

The View Compression Algorithm Identifier <view_compression_algo_id> element is an identifier which names the compression algorithm. For additional information, see 4.1.7 and annex B.

Five view compression algorithms have been identified for this release of the Standard in 4.1.7. It also provides a scheme for using other identifiers created through a national registration authority, such as ANSI. The use of the latter scheme is subject to bilateral agreements and the disclosure of the scheme to the recipient.

Size: 01/03

Type: N

<view_compression_algo_id>(01/03)::= <fltp_registered_algos>

<fltp_registered_algos> ::= <uncompressed> | <t6_facsimile_compression> | <jpeg_baseline> | <jbig>
| <abic> | <reserved_for_X9> | <private>

<uncompressed> ::= "1"

<t6_facsimile_compression> ::= "2"

<jpeg_baseline> ::= "3"

<jbig> ::= "4"

<abic> ::= "5"

<reserved_for_X9> ::= "6" | ... | "499"

<private> ::= "500" | ... | "999"

Values: 1 = Uncompressed

2 = T.6 facsimile compression,

3 = JPEG Baseline (JPEG interchange format)

4 = JBIG

5 = ABIC

0,6,7 - 499 = reserved for use by X9.

500-999 = reserved for private usage

Protocol support: Mandatory

Business usage: Mandatory

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Table 47 - IVS: Item View Data segment element names

IVS: Item View Data segment element names	Size	Data type	Ref.	Protocol support	Business usage
<item_view_data>	—	—	[IVS]	—	—
<item_view_id>	22/66	AN	—	O	B1
<view_creation_date>	08/08	N	—	M	M
<view_compression_algo_id>	01/03	N	—	M	M
<view_raster_data_size>	01/10	N	—	M	M
<view_side_indicator>	01/01	N	—	O	B2
View Decoding Information	—	—	—	—	—
<pixels_per_line>	01/08	N	—	M	M
<number_of_lines>	01/08	N	—	M	M
<resolution_unit>	01/01	N	—	O	B2
<resolution_along_line>	01/08	N	—	M	M
<resolution_across_lines>	01/08	N	—	M	M
<bits_per_pixel>	01/01	N	—	M	M
<interpret_bitmap>	01/01	N	—	M	M
<orientation>	01/01	N	—	O	B2
Partial View Information	—	—	—	—	—
<snippet_info>	—	—	—	O	B25
<snippet_name>	01/02	N	—	C18	B25
<snippet_origin>	01/01	N	—	C19	B25
<snippet_offset>	07/27	AN	—	C20	B25
<snippet_units_of_measure>	01/01	N	—	O	B2
<clipping_info>	—	—	—	O	B26
<clipping_origin>	01/01	N	—	O	B26
<clipping_offset>	04/3	AN	—	O	B26
Additional Information	—	—	—	—	—
<embedded_header_info>	—	—	—	O	B1
<embedded_header_indicator>	01/03	N	—	M	M
<view_raster_data_offset>	01/08	N	—	M	M
<creation_computer>	01/32	AN	—	O	B1
<view_description>	01/32	AN	—	O	B1
<scanner_mfr_name>	01/30	AN	—	O	B1
<scanner_model_name>	01/15	AN	—	O	B1
<view_capture_software>	01/30	AN	—	O	B1

6.4.2.8.1. Item view identifier

The Item View Identifier <item_view_id> element provides a reference identifier for this segment. It is used for storage or processing of the segment's contents. It is composed of the reference item identifier of the parent item loop, and a local-value. The local value is used to distinguish this view from others that may be associated with the imaged item.

Size: 22/66

Type: AN

<item_view_id> (22/66) ::= <item_ref_id> "." <local_value>

Values: Formed by appending a 1 to 7 digit numeric to the value of <item_ref_id>. The 1 to 7 digit numeric shall be unique within Item Views loop structure of this transaction set. See 6.4.2.5.2.

Protocol support: Optional

The following table defines the Item Views structure:

Table 46 - Item views structure element names

Item view structure element names	Size	Data type	Ref.	Protocol support	Business usage
<item_views>	—	—	—	—	—
<loop_header>	—	—	LS	M	M
<item_view_data>	—	—	[IVS]	M	M
<view_binary_data>	—	—	BIN	M	M
<loop_trailer>	—	—	LE	M	M

The components of the Item View structure are as follows:

- One Loop Header <loop_header> whose syntax is defined in 6.3.1.5. The value of <loop_id> shall be "3";
- One Item View Data <item_view_data> segment;
- One View Binary Data <view_binary_data> segment whose syntax is defined in 6.3.1.11. The pixel values contained in the <binary_data> component of the BIN segment shall be encoded as stated in 6.1.8;
- One Loop Trailer <loop_trailer> segment whose syntax is defined in 6.3.1.6. The value of <loop_id> shall be "3".

6.4.2.8. Item view data

The Item View Data <item_view_data> segment conveys two classes of information associated with a view of an imaged item, i.e., associated with the digital representation of a single item. The contents of this segment enables an FII-system-user to operate selectively on the views, without having to process the view's compressed raster data.

The component elements of Item View Data can be viewed as comprising the following groups of data:

- a. View preprocessing information which includes:
Embedded non-X9 image header indicator and offset to the binary encoded raster data object (as illustrated in figure 13);
- b. View decoding information which includes:
*View organization information;
Pixel description information;
View compression information;
View orientation information;
Document storage and retrieval information.*

There shall be a single Item View Data segment (<item_view_data>) for each view (e.g., one for the front view of an imaged item, and one for the back view). Each view may be either a view of the entire side of imaged item, or a portion of it. The <item_view_data> shall indicate whether it is a full, or partial, view by populating appropriate elements. The syntax shall be as follows:

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Table 47 - IVS: Item View Data segment element names

IVS: Item View Data segment element names	Size	Data type	Ref.	Protocol support	Business usage
<item_view_data>	—	—	[IVS]	—	—
<item_view_id>	22/66	AN	—	O	B1
<view_creation_date>	08/08	N	—	M	M
<view_compression_algo_id>	01/03	N	—	M	M
<view_raster_data_size>	01/10	N	—	M	M
<view_side_indicator>	01/01	N	—	O	B2
View Decoding Information	—	—	—	—	—
<pixels_per_line>	01/08	N	—	M	M
<number_of_lines>	01/08	N	—	M	M
<resolution_unit>	01/01	N	—	O	B2
<resolution_along_line>	01/08	N	—	M	M
<resolution_across_lines>	01/08	N	—	M	M
<bits_per_pixel>	01/01	N	—	M	M
<interpret_bitmap>	01/01	N	—	M	M
<orientation>	01/01	N	—	O	B2
Partial View Information	—	—	—	—	—
<snippet_info>	—	—	—	O	B25
<snippet_name>	01/02	N	—	C18	B25
<snippet_origin>	01/01	N	—	C19	B25
<snippet_offset>	07/27	AN	—	C20	B25
<snippet_units_of_measure>	01/01	N	—	O	B2
<clipping_info>	—	—	—	O	B26
<clipping_origin>	01/01	N	—	O	B26
<clipping_offset>	0443	AN	—	O	B26
Additional Information	—	—	—	—	—
<embedded_header_info>	—	—	—	O	B1
<embedded_header_indicator>	01/03	N	—	M	M
<view_raster_data_offset>	01/08	N	—	M	M
<creation_computer>	01/32	AN	—	O	B1
<view_description>	01/32	AN	—	O	B1
<scanner_mfr_name>	01/30	AN	—	O	B1
<scanner_model_name>	01/15	AN	—	O	B1
<view_capture_software>	01/30	AN	—	O	B1

6.4.2.8.1. Item view identifier

The Item View Identifier <item_view_id> element provides a reference identifier for this segment. It is used for storage or processing of the segment's contents. It is composed of the reference item identifier of the parent item loop, and a local-value. The local value is used to distinguish this view from others that may be associated with the imaged item.

Size: 22/66

Type: AN

<item_view_id> (22/66) ::= <item_ref_id> "." <local_value>

Values: Formed by appending a 1 to 7 digit numeric to the value of <item_ref_id>. The 1 to 7 digit numeric shall be unique within Item Views loop structure of this transaction set. See 6.4.2.5.2.

Protocol support: Optional

The following table defines the Item Views structure:

Table 46 - Item views structure element names

Item view structure element names	Size	Data type	Ref.	Protocol support	Business usage
<item_views>	—	—	—	—	—
<loop_header>	—	—	LS	M	M
<item_view_data>	—	—	[IVS]	M	M
<view_binary_data>	—	—	BIN	M	M
<loop_trailer>	—	—	LE	M	M

The components of the Item View structure are as follows:

- One Loop Header <loop_header> whose syntax is defined in 6.3.1.5. The value of <loop_id> shall be "3";
- One Item View Data <item_view_data> segment;
- One View Binary Data <view_binary_data> segment whose syntax is defined in 6.3.1.11. The pixel values contained in the <binary_data> component of the BIN segment shall be encoded as stated in 6.1.8;
- One Loop Trailer <loop_trailer> segment whose syntax is defined in 6.3.1.6. The value of <loop_id> shall be "3".

6.4.2.8. Item view data

The Item View Data <item_view_data> segment conveys two classes of information associated with a view of an imaged item, i.e., associated with the digital representation of a single item. The contents of this segment enables an FII-system-user to operate selectively on the views, without having to process the view's compressed raster data.

The component elements of Item View Data can be viewed as comprising the following groups of data:

- a. View preprocessing information which includes:
Embedded non-X9 image header indicator and
offset to the binary encoded raster data object (as illustrated in figure 13);
- b. View decoding information which includes:
View organization information;
Pixel description information;
View compression information;
View orientation information;
Document storage and retrieval information.

There shall be a single Item View Data segment (<item_view_data>) for each view (e.g., one for the front view of an imaged item, and one for the back view). Each view may be either a view of the entire side of imaged item, or a portion of it. The <item_view_data> shall indicate whether it is a full, or partial, view by populating appropriate elements. The syntax shall be as follows:

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Table 47 - IVS: Item View Data segment element names

IVS: Item View Data segment element names	Size	Data type	Ref.	Protocol support	Business usage
<item_view_data>	—	—	[IVS]	—	—
<item_view_id>	22/66	AN	—	O	B1
<view_creation_date>	08/08	N	—	M	M
<view_compression_algo_id>	01/03	N	—	M	M
<view_raster_data_size>	01/10	N	—	M	M
<view_slide_indicator>	01/01	N	—	O	B2
View Decoding Information	—	—	—	—	—
<pixels_per_line>	01/08	N	—	M	M
<number_of_lines>	01/08	N	—	M	M
<resolution_unit>	01/01	N	—	O	B2
<resolution_along_line>	01/08	N	—	M	M
<resolution_across_lines>	01/08	N	—	M	M
<bits_per_pixel>	01/01	N	—	M	M
<interpret_bitmap>	01/01	N	—	M	M
<orientation>	01/01	N	—	O	B2
Partial View Information	—	—	—	—	—
<snippet_info>	—	—	—	O	B25
<snippet_name>	01/02	N	—	C18	B25
<snippet_origin>	01/01	N	—	C19	B25
<snippet_offset>	01/27	AN	—	C20	B25
<snippet_units_of_measure>	01/01	N	—	O	B2
<clipping_info>	—	—	—	O	B26
<clipping_origin>	01/01	N	—	O	B26
<clipping_offset>	04/43	AN	—	O	B26
Additional Information	—	—	—	—	—
<embedded_header_info>	—	—	—	O	B1
<embedded_header_indicator>	01/03	N	—	M	M
<view_raster_data_offset>	01/08	N	—	M	M
<creation_computer>	01/32	AN	—	O	B1
<view_description>	01/32	AN	—	O	B1
<scanner_mfr_name>	01/30	AN	—	O	B1
<scanner_model_name>	01/15	AN	—	O	B1
<view_capture_software>	01/30	AN	—	O	B1

6.4.2.8.1. Item view identifier

The Item View Identifier <item_view_id> element provides a reference identifier for this segment. It is used for storage or processing of the segment's contents. It is composed of the reference item identifier of the parent item loop, and a local-value. The local value is used to distinguish this view from others that may be associated with the imaged item.

Size: 22/66

Type: AN

<item_view_id> (22/66) ::= <item_ref_id> "." <local_value>

Values: Formed by appending a 1 to 7 digit numeric to the value of <item_ref_id>. The 1 to 7 digit numeric shall be unique within Item Views loop structure of this transaction set. See 6.4.2.5.2.

Protocol support: Optional

The following table defines the Item Views structure:

Table 46 - Item views structure element names

Item view structure element names	Size	Data type	Ref.	Protocol support	Business usage
<item_views>	—	—	—	—	—
<loop_header>	—	—	LS	M	M
<item_view_data>	—	—	[VS]	M	M
<view_binary_data>	—	—	BIN	M	M
<loop_trailer>	—	—	LE	M	M

The components of the Item View structure are as follows:

- One Loop Header <loop_header> whose syntax is defined in 6.3.1.5. The value of <loop_id> shall be "3";
- One Item View Data <item_view_data> segment;
- One View Binary Data <view_binary_data> segment whose syntax is defined in 6.3.1.11. The pixel values contained in the <binary_data> component of the BIN segment shall be encoded as stated in 6.1.8;
- One Loop Trailer <loop_trailer> segment whose syntax is defined in 6.3.1.6. The value of <loop_id> shall be "3".

6.4.2.8. Item view data

The Item View Data <item_view_data> segment conveys two classes of information associated with a view of an imaged item, i.e., associated with the digital representation of a single item. The contents of this segment enables an FII-system-user to operate selectively on the views, without having to process the view's compressed raster data.

The component elements of Item View Data can be viewed as comprising the following groups of data:

- a. *View preprocessing information which includes:*
Embedded non-X9 Image header indicator and
offset to the binary encoded raster data object (as illustrated in figure 13);
- b. *View decoding information which includes:*
View organization information;
Pixel description information;
View compression information;
View orientation information;
Document storage and retrieval information.

There shall be a single Item View Data segment (<item_view_data>) for each view (e.g., one for the front view of an imaged item, and one for the back view). Each view may be either a view of the entire side of imaged item, or a portion of it. The <item_view_data> shall indicate whether it is a full, or partial, view by populating appropriate elements. The syntax shall be as follows:

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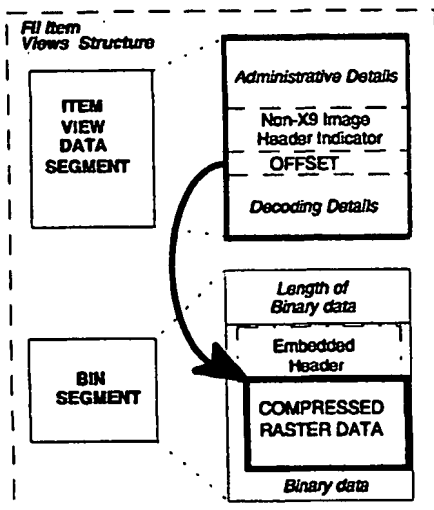


Figure 13 - The Item Views structure model

Protocol support: Optional

Business usage: Conditional, shall be present unless explicitly omitted in the Banking Practices Agreement

6.4.2.5.10. User data present indicator

The User Data Present Indicator `<user_data_present_indicator>` element conveys an indication that supplementary information is carried in a User Data segment that immediately follows Item Information segment.

Size: 01/01

Type: N

`<user_data_present_indicator>(01/01) ::= <absent> | <present>`

`<absent> ::= "0" - DEFAULT`

`<present> ::= "1"`

Values: "0" indicates that a User Data segment is not present [DEFAULT];
"1" indicates that a User Data segment is present.

Protocol support: Optional

Business usage: Conditional, shall be present only if specified in Banking Practices Agreement.

6.4.2.6. User data

The User Data `<user_data>` segment conveys information that has been structured by the originating FII-system-user in accordance with the Banking Practices Agreement. It has with the receiving FII-system-user. The content is carried in the `<binary>` component of a BIN segment. The semantics of the `<binary>` contents shall be understood by the receiver according to bilateral agreements specified in the Banking Practices Agreement.

The syntax of the User data segment is that of a BIN segment. The BIN segment syntax is specified in 6.3.1.11.

`<user_data> ::= <bin_segment>`

Protocol support: Optional

Business usage: Conditional, shall be present only if specified in Banking Practices Agreement.

6.4.2.7. Item views structure

Each Item Views `<item_views>` structure contains a single view of an imaged financial item (e.g. one digitized view of a check). It is composed of a loop header, loop trailer, a segment of item view data, and a binary segment containing the view's raster data. Each instance of an item view structure contains decoding and cross-referencing data in the `<item_view_data>` segment. Each instance may contain decoding data in a `<view_binary_data>` segment that contains the compressed (or uncompressed) raster data.

When performing functional decomposition, the data structure may be illustrated as in figure 13:

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Type: N

<item_amount>(02/12) ::= <numeric>

Values: 00 through 999999999999

Protocol support: Optional

Business usage: Conditional, shall be present unless explicitly omitted in the Banking Practices Agreement.

6.4.2.5.8. Payor bank routing number

The Payor Bank Routing Number <payor_bank_routing_number> element conveys the routing number of the financial institution by, or through whom, the item is payable. If X9.37 is used, this is the Payor Bank Routing Number from the check detail record (type 25, field 4 and 5 concatenated).

Size: 09/09

Type: N

<payor_bank_routing_number>(09/09) ::= <routing_number>

Values: 000000000 through 999999999

Protocol support: Optional

Business usage: Conditional, shall be present unless explicitly omitted in the Banking Practices Agreement.

6.4.2.5.9. Image key

The image key <image_key> data element contains a unique value which is assigned to the image to provide a cross-reference between the financial data and the images and associated image data. This value is unique within the ECE institution. The construction of the value is defined by <type_of_financial_data> data element in the General FI Extensions (see 6.3.2.7).

Size: 34/34

```

<image_key> (34/34) ::= <string> |
  <ece_routing_number><ece_business_date><ece_sequence_number><ece_cycle_number>

  <ece_routing_number> ::= <routing_number>
  <ece_business_date> ::= <x9_date>
  <ece_sequence_number> ::= <string>
  <ece_cycle_number> ::= <string>

```

Values: The value shall be constructed from one or more elements contained within the associated financial data.

If the financial data is in the X9.37 format, i.e., <type_of_financial_data> has a value of "1", the value shall be constructed by concatenating the following X9.37 financial data elements in the listed order:

- ECE Routing Number (Type 20, Field 4);
- ECE Business Date (Type 20, Field 5);
- ECE Sequence Number (Type 25, Field 8); and
- ECE Cycle (Type 20, Field 9).

If the financial data is in any other format, i.e., <type_of_financial_data> has a value of "2" through "99", the value is constructed as defined by the Banking Practices Agreement of the participating institutions.

Each view associated a single imaged item may be encoded the same, or in accordance with different compression techniques. Six view compression algorithms have been identified for this release of the Standard in 4.1.7. This Standard also provides a scheme for using privately registered identifiers created through a national registration authority, such as ANSI. The use of the latter scheme is subject to bilateral agreements, and the disclosure of the scheme to the recipient.

Size: 01/V

Type: AN

<compression_indicators> ::= **<view_compression_algorithm_id>**
{ <us> <view_compression_algorithm_id> }

Values: see 6.4.2.8.3

Protocol support: Mandatory

Business usage: Mandatory

6.4.2.5.4. View count

The View Count **<view_count>** data element contains a physical count of the number of views conveyed for this imaged item.

Size: 01/08

Type: N

<view_count>(01/08) ::= **<numeric>**

Values: 0 = 0 through 99999999

Protocol support: Mandatory

Business usage: Mandatory

6.4.2.5.5. Item information cross references

The Item Information Cross References (**<iih_cross_references>**) element contains one or more transaction set cross references which relate this imaged item to another Item View Transaction set(s), Financial Data transaction set(s), or Query Request transaction set(s). There may be up to six cross references.

Size: 16/257

Type: AN

<iih_cross_references>(16/257) ::= **<ts_cross_reference>**

Values: See 6.3.2.6

Protocol support: Optional

Business usage: Conditional, shall be present when cross referencing to another X9.46 transaction set, unless explicitly omitted by the Banking Practices Agreement..

6.4.2.5.6. to be removed

6.4.2.5.7. Item amount

The Item Amount **<item_amount>** element conveys the amount (in cents) of the imaged item. Often, the originator of the functional group will derive the value from the imaged item's associated ECE data. Minimum is 0 cents. If X9.37 is used, this is the amount from the check detail record (type 25, field 7).

Size: 02/12

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Table 45 - Item Information Header: Item information element names

IIH Item Information element names	Size	Data type	Ref.	Protocol support	Business usage
<item_information>	—	—	[IIH]	—	—
<item_views_length>	01/10	N	—	M	M
<item_ref_id>	20/58	AN	—	O	B1
<compression_indicators>	01/V	AN	—	M	M
<view_count>	01/08	N	—	M	M
<iih_cross_references>	16/257	AN	—	O	B23
<item_amount>	02/12	N	—	O	B2
<payor_bank_routing_number>	09/09	N	—	O	B24
<image_key>	34/34	AN	—	O	B2
<user_data_present_indicator>	01/01	N	—	O	B1

6.4.2.5.1. Item views length

The Item Views Length (<item_views_length>) conveys a numeric length (in bytes) of the <item_views> segment's content. It starts from the first byte after this segment (IIH) and includes all bytes up to (but excluding the start of the corresponding <loop_trailer> (LE) whose <loop_id> = "2".

Size: 01/10

Type: N

<item_views_length>(01/10) ::= <numeric>

Values:

Protocol support: MandatoryBusiness usage: Mandatory**6.4.2.5.2. Item reference identifier**

The Item Reference Identifier <item_ref_id> conveys a unique identifier assigned by the originator for the receiver. It is intended to be used for subsequent processing by the receiver to correlate related transaction sets and in acknowledgments when necessary. Its value is constructed by extending the <isd_ref_id>.

Size: 20/58

Type: AN

<item_ref_id> (20/58) ::= <isd_ref_id> "." <local_value>

Values: Concatenation of the following data elements:

<isd_ref_id> see 6.4.2.3.2. and
<local_value> which is a 1-7 digit numeric.

Protocol support: OptionalBusiness usage: Conditional, shall be present only if specified in Banking Practices Agreement**6.4.2.5.3. Compression indicators**

The Compression Indicators <compression_indicators> data element contains a list of all of the unique compression scheme identifiers used in each of the associated view detail segments for this item. Each unique identifier shall be separated by <us>. This may be used by the receiver to ensure that it can handle the compression schemes received. For additional information see 4.1.7 and annex B.

6.4.2.4. Item data loop

The Item Data Loop <item_data_loop> structure contains information about a single imaged item. Information (such as amount, routing number, image key, and optionally aspects of MICR code-line data) is conveyed at the imaged item level while one or more digitized views, together with data needed to interpret the image of a check item, is conveyed within a subordinate loop. The electronic data relevant to the specific item is present in the <item_information> segment, while the <item_views> loop structure contains the decoding data and the compressed (or uncompressed) raster data for each view of the digitized item.

In the FII system, the paper check, for example, is represented as a single imaged item comprising one or more views of the same physical item. When more than one view is present for a imaged item, one view may provide a frontal representation, and another view may provide a representation of the reverse side of the physical item. A single view shall not contain both a frontal and rear view.

Protocol support: Mandatory

Business usage: Mandatory

Table 44 - Item data loop element names

Item data loop element names	Size	Data type	Ref.	Protocol support	Business usage
<item_data_loop>	—	—	—	—	—
<loop_header>	—	—	LS	M	M
<signature_data>	—	—	[SIG]	O	B9
<signature>	—	—	[BIN]	C6	B9
<item_information>	—	—	[IIF]	M	M
<user_data>	—	—	BIN	O	B1
<item_views>	—	—	—	M	M
<loop_trailer>	—	—	LE	M	M

The components of the item loop are as follows:

- One Loop Header <loop_header> segment defined in 6.3.1.5. The value of <loop_id> shall be "2";
- Optionally, one Signature Data <signature_data> segment whose syntax is defined in 6.3.1.13.2. The Length of Data <length_of_data> element refers only to the <binary_data> component of the BIN segment of the <view_binary_data>;
- Conditionally, one Signature Segment <signature> which conveys the digital signature whose syntax is defined in 6.3.1.13.2. This segment will be present whenever a <signature_data> segment is present. This digital signature is understood to apply to the <binary_data> component of the BIN segment of <view_binary_data>;
- One Item Information <item_information> segment;
- Optionally, one User Data <user_data> segment, whose syntax is defined in 6.4.2.6. A User Data segment is an alias for a Bin Segment. It is provided to carry a privately agreed stream of data;
- One or more Item Views <item_views> segment;
- One Loop Trailer <loop_trailer> segment defined in 6.3.1.6. The value of <loop_id> shall be "2"

6.4.2.5. Item information

The Item Information <item_information> segment conveys item level information.

Protocol support: Mandatory

Business usage: Mandatory

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Business usage: Mandatory

6.4.2.3.4.2 ISD subgroup recipient ID

The ISD Subgroup Recipient ID `<isd_subgroup_recipient_id>` is a value which specifies the intended recipient of the image item.

If the value of `<fil_id_qualifier>` is "17", the application sender ID shall be the bank's routing number. Otherwise, the value of this element shall be as registered by that entity. The syntax of this element is that of `<sender_id>` defined in 6.2.3.3.2.

Size: 01/15

Type: AN

Values: See 6.2.3.3

Protocol support: Mandatory

Business usage: Mandatory

6.4.2.3.5. ISD cross references

The ISD Cross References `<isd_cross_references>` element conveys the FII cross-referencing information for this subgroup of items to another FII defined transaction set. It may be used to override or refine the cross-referencing value contained in the `<general_fii_extensions>` segment. The syntax is defined in 6.3.2.6 of this Standard.

Size: 16/257

Type: AN

~~`<isd_cross_references>(16/257) ::= <ts_cross_references>`~~

Values:

Protocol support: Optional.

Business usage: Conditional, shall be present only if specified in Banking Practices Agreement.

6.4.2.3.6. ISD subgroup amount

The ISD Subgroup Amount `<isd_subgroup_amount>` element conveys the calculated total amount of the imaged items within the Item Subgroup. Its value is conveyed in *cents*.

Size: 01/16

Type: N

`<isd_subgroup_amount>(01/16) ::= <numeric>`

Values:

Protocol support: Optional

Business usage: Conditional, shall be present unless explicitly omitted in the Banking Practices Agreement.

<isd_ref_id>(18/50) ::= <ts_ref_id> "." <local_value>

<local_value>(01/07) ::= <numeric>

Values: Concatenation of these data elements:

Transaction set identifier (<ts_ref_id>) from 6.3.2.2.;

Local Value (<local_value>): A numeric value created by the originator such that each item subgroup reference identifier in this transaction set shall have a unique value.

Protocol support: Mandatory

Business usage: Mandatory

6.4.2.3.3. ISD Item count

The ISD Item Count <isd_item_count> element conveys a total count of the items within the Item Subgroup structure. It is used for control purposes.

Size: 01/08

Type: N

<isd_item_count>(01/08) ::= <numeric>

Values: 1 through 99999999

Protocol support: Mandatory

Business usage: Mandatory

6.4.2.3.4. ISD Subgroup recipient

The ISD Subgroup Recipient <isd_subgroup_recipient> element identifies the immediate destination for the imaged items in this subgroup.

For example, if the financial (ECE) data has been exchanged in X9.37 file format, this is the Final Destination Routing Number (Field 3) from the Bundle Header Record (Type 20) of the X9.37 file. Its value is not necessarily the final destination bank's routing number of each of the imaged items in the subgroup.

Size: 04/18

Type: AN

<isd_subgroup_recipient>(04/18) ::= <fil_id_qualifier> <us> <isd_subgroup_recipient_id>

- identifies to whom an image item is to be addressed.

<isd_subgroup_recipient_id> (01/15) ::= <string>

Protocol support: Mandatory

Business usage: Mandatory

6.4.2.3.4.1. Fil ID qualifier

The Fil ID Qualifier <fil_id_qualifier> element conveys a value indicating the registrar of the Fil Acknowledgment Recipient ID information. The syntax of this element is that of <inter_id_qualifier> defined in 6.2.3.3.1.

Syntax and values are specified in 6.2.3.3.1

Protocol support: Mandatory

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- One Item Subgroup Information *<item_subgroup_information>* segment;
- One or more Item Data Loop *<item_data_loop>* structures. Each instance of the *<item_data_loop>* is relevant to a single item.;
- One Loop Trailer *<loop_trailer>* segment whose syntax is defined in 6.3.1.6. The value of *<loop_id>* shall be "1".

6.4.2.3. Item subgroup information segment

Each Item Subgroup Information segment (*<item_subgroup_information>*) conveys supporting information which is relevant to all items of the imaged Item Subgroup. It is carried for control and routing purposes. Its values apply to all imaged item data structures contained within the bounding Loop Header [LS(1)] and corresponding Loop Trailer.

Protocol support: Mandatory

Business usage: Mandatory

Table 43 - ISD: Item subgroup information element names

ISD: Item subgroup information elements names	Size	Data type	Ref.	Protocol support	Business usage
<i><item_subgroup_information></i>	—	—	[ISD]	—	—
<i><item_data_loop_length></i>	02/10	N	—	M	M
<i><isd_ref_id></i>	18/50	AN	—	M	M
<i><isd_item_count></i>	01/08	N	—	M	M
<i><isd_subgroup_recipient></i>	04/18	AN	—	M	M
<i><isd_cross_references></i>	18/257	AN	—	O	B1
<i><isd_subgroup_amount></i>	01/16	N	—	O	B2

6.4.2.3.1. Item data loop length

The Item Data Loop Length *<item_data_loop_length>* element conveys the total size (in bytes) of the *<item_data_loop>* structure. It starts from the first byte after this segment (ISD) and includes all bytes up to (but excluding) the start of the corresponding *<loop_trailer>* (LE), whose *<loop_id>*="1"..

Size: 02/10

Type: N

<item_data_loop_length>(02/10) ::= *<numeric>*

Values: 1 through 9999999999

Protocol support: Mandatory

Business usage: Mandatory

6.4.2.3.2. Item subgroup reference identifier

The Item Subgroup Reference Identifier *<isd_ref_id>* element conveys a unique identifier assigned by the originator. It may be used by a receiving FI-system-user for acknowledgments, or audit and control purposes.

It is constructed by concatenating the value of *<ts_ref_id>*, and a locally determined 1-7 digit numeric value. This value shall be unique to this transaction set. The local value is separated from the rest of the identifier by a "." character in order to avoid any possibility of ambiguity.

Size: 18/50

Type: AN

6.4.2.1. Item group transaction set

Each Item Group Transaction Set **<item_group_ts>** specifies a group of imaged Items which have been grouped together for the purposes of the interchange; they may or may not share a common bond. For example, in the context of the forward or return processing of paper checks, the set may be thought of as a cash letter.

Protocol support: Mandatory

Business usage: Mandatory

Table 41 - Item group transaction set element names

Item group transaction set element names	Size	Data type	Ref.	Protocol support	Business usage
<item_group_ts>	—	—	—	—	—
<trans_set_header>	—	—	ST	M	M
<general_FII_extensions>	—	—	[GFD]	M	M
<item_subgroup>	—	—	—	M	M
<trans_set_trailer>	—	—	SE	M	M

Each transaction set comprises the following segments:

- One Transaction Set Header **<trans_set_header>** segment. Its syntax is defined in 6.3.1.3. The value of **<trans_set_id>** shall be "TTS";
- One General FII Extensions **<general_FII_extensions>** segment, whose syntax is defined in 6.3.2;
- One or more Item Subgroup(s) **<item_subgroup>** structures;
- One Transaction Set Trailer **<trans_set_trailer>** segment, whose syntax is defined in 6.3.1.4.

6.4.2.2. Item subgroup

An Item Subgroup **<item_subgroup>** specifies a subgroup of imaged items.

In the paper item world of *forward processing*, a subgroup could correspond to a bundle of checks.

Protocol support: Mandatory

Business usage: Mandatory

Table 42 - Item subgroup loop structure element names

Item subgroup loop structure element names	Size	Data type	Ref.	Protocol support	Business usage
<item_subgroup>	—	—	—	—	—
<loop_header>	—	—	LS	M	M
<item_subgroup_information>	—	—	[ISO]	M	M
<item_data_loop>	—	—	—	M	M
<loop_trailer>	—	—	LE	M	M

The components of each instance of an Item Subgroup loop are as follows:

- One Loop Header **<loop_header>** segment, whose syntax is defined in 6.3.1.5. The value of **<loop_id>** shall be "1";

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For example, if the value of `<type_of_financial_data>` is "1", it indicates that the content of the `<binary_data>` element contains a financial data stream whose encoding conforms to the requirements of X9.37.

`<financial_data>` ::= `<bin_segment>`

Protocol support: Mandatory

Business usage: Mandatory

6.4.2 Item views functional group

The Item Views Functional Group `<item_views_fg>` is used by the FII-system-user to convey groups of item imaging information or views, or both. Included in each group are one or more transaction sets of item imaging information or images, or both. Included in each transaction set is one or more loops containing subgroups of item imaging information and corresponding views of an imaged item.

Table 40 - Item views functional group element names

Item views functional group element names	Size	Data type	Ref.	Protocol support	Business usage
<code><item_views_fg></code>	—	—	—	—	—
<code><fg_header></code>	—	—	GS	M	M
<code><fg_security_header></code>	—	—	S1S	O	B9
<code><signature_ts></code>	—	—	—	O	B9
<code><item_group_ts></code>	—	—	—	M	M
<code><fg_security_trailer></code>	—	—	S1E	C1	B9
<code><fg_trailer></code>	—	—	GE	M	M

Each Item Views functional group comprises the following:

- One Function Group Header `<fg_header>` segment;

The Functional Group Header `<fg_header>` syntax is defined in 6.3.1.1. The value of `<functional_group_id>` shall be "1" for an Item Views functional group;

- Optionally, one Function Group Security Header segment;

The Functional Group Security Header `<fg_security_header>` segment syntax is defined in 6.3.1.7;

- Optionally, one Signature Transaction Set structure;

The Signature Transaction Set structure `<signature_ts>` syntax is defined in 6.3.1.13.1;

- One or more Item Group Transaction Sets `<item_group_ts>` structure(s);

- Conditionally, one Function Group Security Trailer segment;

The Function Group Security Trailer `<fg_security_trailer>` segment syntax is defined in 6.3.1.8;

- One Functional Group Trailer segment `<fg_trailer>` segment;

The Functional Group Trailer segment `<fg_trailer>` syntax is defined in 6.3.1.2.

Views functional Group for the purpose of cross referencing and tracking, or other local purposes. The Financial Data transaction set is defined in 6.4.1.1 of this Standard;

- Conditionally, one Functional Group Security Trailer segment;

The Functional Group Security Trailer *<fg_security_trailer>* may provide the MAC for data integrity purposes, and shall be present when the *<fg_security_header>* data element is present to signal the end of the security mechanism identified in the *<fg_security_header>*. The syntax shall be as specified in 6.3.1.8;

- One Functional Group Trailer segment;

The Functional Group Trailer *<fg_trailer>* designates the end of a functional group. It is defined in 6.3.1.2.

6.4.1.1 Financial data transaction set

Each Financial Data Transaction Set *<financial_data_t_set>* conveys the segments that are used to exchange financial data. There shall be a single instance of a financial data segment per Financial Data Transaction Set. This financial data may relate to one, or more, image sets being exchanged between the financial institution applications. There may, or may not, be a relationship between the financial data in an interchange and an item view's functional group in the same interchange.

Protocol support: Mandatory

Business usage: Mandatory

The structure of a financial data transaction set shall be as follows:

Table 39 - Financial data transaction set element names

Financial data transaction set element names	Size	Data type	Ref.	Protocol support	Business usage
<i><financial_data_t_set></i>	—	—	—	—	—
<i><trans_set_header></i>	—	—	ST	M	M
<i><general_FII_extensions></i>	—	—	[GFD]	M	M
<i><financial_data></i>	—	—	BIN	M	M
<i><trans_set_trailer></i>	—	—	SE	M	M

Each Financial Data Transaction Set *<financial_data_t_set>* comprises the following segments:

- One Transaction Set Header *<trans_set_header>* segment.
Its syntax is defined in 6.3.1.3. The value of *<trans_set_id>* component shall be "FTS";
- One General FII Extensions *<general_FII_extensions>* segment.
Its syntax is defined in 6.3.2. The elements *<type_of_financial_data>* and *<type_of_ts_data>* shall have values unless a DEFAULT value is appropriate;
- One Financial Data *<financial_data>* segment.
It may only be absent when the interchange is a test FII;
- One Transaction Set Trailer *<trans_set_trailer>* segment, whose syntax is defined in 6.3.1.4.

6.4.1.2 Financial data segment

The Financial Data Segment *<financial_data>* is used in this transaction set to carry financial data as a continuous stream of data in a binary segment *<bin_segment>*. The *<bin_segment>* carries a *<binary_data>* element. The encoding and semantics of the *<binary_data>* element shall be as specified in the *<type_of_financial_data>* component of *<general_FII_extensions>* defined in 6.3.2.7.

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Protocol support: Conditional, valid only in a Item Group Transaction Set .

Business usage: Conditional, shall be present only in an Item Group Transaction Set..

6.4 Functional groups definitions

The following clauses define the X9 defined functional group structures used in the protocol, introduced in 6.2.1, and illustrated in annex F.

6.4.1 Financial data functional group

The Financial Data Functional Group <financial_data_fg> is the functional group that conveys financial data, such as an electronic cash letter. When present, the contents may relate to an Item Views functional group in this, or another, interchange. Depending upon the local security policy in force, mechanisms may need to be present for FII authentication, and non-repudiation security services.

Because of the importance of the financial data, it is recommended that financial data functional groups be sent in separate interchanges.

The data structure shall be defined as follows:

Table 38 - Financial data functional group structure element names

Financial Data functional group structure element names	Size	Data type	Ref.	Protocol support	Business usage
<financial_data_fg>	—	—	—	—	—
<fg_header>	—	—	GS	M	M
<fg_security_header>	—	—	S1S	O	BS
<signature_ts>	—	—	—	O	BS
<financial_data_t_set>	—	—	—	M	M
<fg_security_trailer>	—	—	S1E	C1	BS
<fg_trailer>	—	—	GE	M	M

Each Financial Data functional group <financial_data_fg> structure comprises the following segments:

- **One Functional Group Header segment.**
The Functional Group Header <fg_header> identifies a financial transaction. Its syntax is defined in 6.3.1.1. The value of <functional_group_id> shall be "70";
- **Optionally, one Functional Group Security segment.**
The Functional Group Security <fg_security_header> may be used to provide data integrity and data protection to the entire functional group's contents. It also may convey the algorithm identifier used in the signature transaction set that may follow. The syntax shall be as specified in 6.3.1.7;
- **Optionally, one Signature Transaction Set structure.**
The Signature Transaction Set <signature_ts> may be used to provide authentication checking by the receiver. The algorithm used to create the digital signature is found in the associated data segment. The syntax shall be as specified in 6.3.1.13.1;
- **One or more Financial Data Transaction Set structure(s).**
Each Financial Data Transaction Set <financial_data_t_set> contains a single financial data stream and preprocessing information. Its stream of financial data is carried as a binary object whose syntax and semantics is specified by the sender. For example, the user may send the data in the binary object in the format specified by X9.37. It may be associated with an Item

Business usage: Conditional, shall be present when `<general_fii_extensions>` are conveyed in the Item Group Transaction Set..

6.3.2.10. Item group amount

The Item Group Amount `<item_group_amount>` element conveys the total value of the items contained in the Item Group Transaction Set conveyed in cents. If X9.37 is used and all of the items in the cash letter have an image in this group, this is the Cash Letter Total from the Cash Letter Trailer record (type 90, field 4).

Size: 01/16

Type: N

`<item_group_amount>(01/16) ::= <numeric>`

Values: Locally determined

Protocol support: Conditional, valid only in a Item Group Transaction Set

Business usage: Conditional, shall be present unless explicitly omitted in the Banking Practices Agreement.

6.3.2.11. Item group recipient identifier

The Item Group Recipient Identifier `<item_group_recipient_id>` element conveys the value as it is provided by the originating financial institution. Its value identifies the intended destination of all imaged items in the transaction set.

When the group relates to a digital cash letter conveyed in a X9.37 compliant format, the value shall be that of the Final Destination Routing Number from the Cash Letter Header record (type 10, field 3).

The syntax of this element is the same as `<send_acknowledgments_to>` defined in

6.3.2.5 of this specification.

Size: 04/18

Type: AN

`<item_group_recipient_id>(04/18) ::= <send_acknowledgments_to>`

Value: see 6.2.3.3.2

Protocol support: Conditional, valid only in a Item Group Transaction Set .

Business usage: Conditional, shall be present only in an Item Group Transaction Set..

6.3.2.12. Item subgroup count

The Item Subgroup Count `<item_subgroup_count>` element conveys a value which is the total number of item subgroups in the transaction set. If the subgroup represents images of an X9.37 bundle, this value is the number of bundles.

This data element is only used when `<general_fii_extensions>` are conveyed in the Item Views functional group.

Size: 01/08

Type: N

`<item_subgroup_count> (01/08) ::= <numeric>`

Values: 0 through 99999999

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**<type_of_financial_data>(01/02) ::= <x9_37> | <eccho> | <federal_reserve_clps_format>
| <reserved_for_x9_use> | <private_formats>**

<x9_37> ::= "1" -- DEFAULT
<eccho> ::= "2"
<federal_reserve_clps_format> ::= "3"
<reserved_for_x9_use> ::= "4" | ... | "50"
<private_formats> ::= "51" | ... | "99"

Values: 1 X9.37 conformant processing data [DEFAULT];
 2 ECCHO conformant processing data;
 3 Federal Reserve CIPS-format;
 4..50 Reserved for X9 use;
 51..99 Reserved for private use by financial institutions

Protocol support: Optional.

Business usage: Conditional, shall be present unless explicitly omitted in the Banking Practices Agreement

6.3.2.8. Count of financial data items

The Count Of Financial Data Items **<count_of_financial_data_items>** element conveys a value which is a total count of the items contained in the financial data's BIN segment. This data element is used only when **<general_FII_extensions>** are conveyed in the Financial Data Transaction Set.

For example, if the ECE data is in X9.37 format, this shall be the value of the Items field within Cash Letter Count (Field 3) from Cash Letter Control Record (Type 90) of the X9.37 data stream.

Size: 01/08

Type: N

<count_of_financial_data_items>(01/08) ::= <numeric>

Values: 0 through 99999999

Protocol support: Conditional, valid only in a Financial Data Functional Group.

Business usage: Conditional, shall be present when **<general_fii_extensions>** are conveyed in the Financial Data Functional Group..

6.3.2.9. Count of imaged items

The Count Of Imaged Items **<count_of_imaged_items>** element conveys the originator's count of the imaged items contained in this transaction set. This element is used only when **<general_FII_extensions>** are conveyed in the Item Group Transaction Set. This is not a count of the number of views.

Size: 01/08

Type: N

<count_of_imaged_items>(01/08) ::= <numeric>

Values: 0 through 99999999

Protocol support: Conditional, valid only in a Item Group Transaction Set.

6.3.2.5.1. FII ID qualifier

The FII ID Qualifier **<fii_id_qualifier>** element conveys a value indicating the registrar of the FII Acknowledgment Recipient ID information. The syntax of this element is that of **<inter_id_qualifier>** defined in 6.2.3.3.1.

Values: see 6.2.3.3.1

<inter_id_qualifier> (02/02) ::= **<id>** -- data element 105 : X12.5

Protocol support: Mandatory

Business usage: Mandatory

6.3.2.5.2 FII acknowledgment recipient ID

The FII Acknowledgment Recipient ID **<fii_ack_recipient_id>** is a value which defines the intended acknowledgment recipient.

If the value of **<fii_id_qualifier>** is "17", the application sender ID shall be the bank's routing number. Otherwise, the value of this element shall be as registered by that entity. The syntax of this element is that of **<sender_id>** defined in 6.2.3.3.2.

Values: See 6.2.3.3

Protocol support: Mandatory

Business usage: Mandatory

6.3.2.6. Transaction set cross references

The Transaction Set Cross References **<ts_cross_references>** element conveys a sequence of one, or more transaction set cross references to which this transaction set relates. For example, this type of cross reference can be useful for cross-referencing outstanding query requests to responses, or item view(s) to financial data transmissions which were sent in earlier transmissions.

The subelement separator **<us>** shall be present when more than one value is present.

Size: 16/257 (up to 6 instances of **<ts_ref_id>**)

Type: AN

<ts_cross_references>(16/257) ::= **<ts_ref_id>** { **<us>** **<ts_ref_id>** } -- may be repeated up to six times

Values: concatenation of the transaction set cross reference elements

Protocol support: Optional

Business usage: Conditional, shall be present when responding to query request, may be present for other transaction sets..

6.3.2.7. Type of financial data

The Type Of Financial Data **<type_of_financial_data>** element conveys an indicator of the layout of the financial data contained in the binary data segment for this Financial Data Transaction Set.

Size: 01/02

Type: N

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Business usage: Conditional, shall be present if an acknowledgement is requested, and the defaults are inappropriate..

6.3.2.4.3 Acknowledgment Security

Acknowledgment Security specifies what, if any, security services are requested with the requested acknowledgment.

Size: 01/02

Type: N

```
<ack_security> ::= <no_sec_is_requested> | <non_repudiation_sec_is_requested> | <macd_sec_is_requested> | <data_protected_sec_is_requested> | <non_repud_and_data_protected_sec_is_requested> | <non_repud_and_macd_sec_is_requested> | <macd_and_data_protected_sec_is_requested> | <macd_data_protected_and_non_repud_sec_is_req>
```

```
<no_sec_is_requested> ::= "0"
<non_repudiation_sec_is_requested> ::= "1"
<macd_sec_is_requested> ::= "2"
<data_protected_sec_is_requested> ::= "3"
<non_repud_and_data_protected_sec_is_requested> ::= "4"
<non_repud_and_macd_sec_is_requested> ::= "5"
<macd_and_data_protected_sec_is_requested> ::= "6"
<macd_data_protected_and_non_repud_sec_is_req> ::= "7"
```

Values: 0= No security requested; [DEFAULT]

- 1= Non-Repudiation security is requested;
- 2= Mac'd security is requested
- 3= Data Protected security is requested;
- 4= Non-Repudiation and Data Protected security is requested
- 5= Non-Repudiation and Mac'd security is requested
- 6= Mac'd and Data Protected security is requested;
- 7= Mac'd, Data Protected, and Non-Repudiation security is requested.

Protocol Support: Optional

Business Usage: Conditional, shall be present if an acknowledgement is requested, and the defaults are inappropriate.

6.3.2.5. Send acknowledgments to

The **Send Acknowledgments To** <send_acknowledgments_to> element names the originator's desired recipient to which to direct FII acknowledgment. The absence of this element of protocol conveys the semantics that acknowledgments are to be returned to the value of ISA Header's component: Sender (<sender>). When present, it comprises two data elements: <fii_id_qualifier> and <fii_ack_recipient_id>. See 6.2.3.3.1.

```
<send_acknowledgments_to> (04/18) ::= <fii_id_qualifier> <us> <fii_ack_recipient_id>
-- identifies to whom a FII acknowledgment is to be addressed if other than the originator
```

```
<fii_id_qualifier> (02/02) ::= <inter_id_qualifier>
<fii_ack_recipient_id> (01/15) ::= <string>
```

Protocol support: Optional

Business usage: Conditional, shall be present only to redirect an acknowledgement to a recipient other than the sender of this functional group..

Business usage: Conditional, shall be present if an acknowledgement is requested, and the defaults are inappropriate..

6.3.2.4.1 Acknowledgment condition

The Acknowledgment Condition (<ack_condition>) subelement specifies the conditions under which an acknowledgment should be generated by the receiver of the interchange, i.e., if it accepts the interchange or fails to accept the interchange, or both, or neither. When the General FII Extensions segment is used in the context of a Query Request the Acknowledgment Condition shall be other than 0.

Size: 01/01

Type: N

<ack_condition>(01/01) ::= <ack_not_requested> | <ack_on_failure_or_success>
| <ack_only_on_failure> | <ack_only_on_success>

<ack_not_requested> ::= "0" - - Overrides any value if present in <type_of_request>
<ack_on_failure_or_success> ::= "1"
<ack_only_on_failure> ::= "2" - DEFAULT
<ack_only_on_success> ::= "3"

Values: 0= Acknowledgment not requested;
1= Acknowledgment requested on failure or success;
2= Acknowledgment requested only on failure, i.e., rejection of the interchange or its component. [DEFAULT];
3= Acknowledgment requested only on success i.e., acceptance of the interchange or its component.

Protocol support: Optional.

Business usage: Conditional, shall be present if an acknowledgement is requested, and the defaults are inappropriate..

6.3.2.4.2 Type of request

The Type Of Request (<type_of_request>) subelement specifies the type of acknowledgment response requested.

If the Acknowledgment Condition is 0, both the preceding subelement delimiter and a value in the Type of Request subelement shall be absent.

Size: 01/02

Type: N

<type_of_request>(01/02) ::= <func_ack_is_requested> | <app_ack_is_requested> |
<both_fa_and_aa_are_requested>

<func_ack_is_requested> ::= "0"
<app_ack_is_requested> ::= "1" - DEFAULT
<both_fa_and_aa_are_requested> ::= "2"

Values: 0= Functional Acknowledgment is requested;
1= Application Acknowledgment is requested [DEFAULT];
2= Both a Functional Acknowledgment and an Application Acknowledgment are requested;

Protocol support: Optional

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```

<type_of_ts_data>(01/03) ::= <response_to_query> |
  <forward_processing> | <returns> | <positive_pay> | <account_recon> | <subpoena> | <signature_verify> |
  <statementing> | <mixed_type> | <reserved_for_x9> | <private_ts_type>

<response_to_query>      ::= "1"
<forward_processing>    ::= "2"
<returns>                ::= "3"
<positive_pay>          ::= "4"
<account_recon>         ::= "5"
<subpoena>              ::= "6"
<signature_verify>      ::= "7"
<statementing>          ::= "8"
<mixed_type>            ::= "9"
<reserved_for_x9>       ::= "10" | ... | "500"
<private_ts_type>       ::= "501" | ... | "999"

```

Values:

- 1 Response to query
- 2 Forward processing
- 3 Returns
- 4 Positive Pay
- 5 Account reconciliation
- 6 Subpoena
- 7 Signature verify
- 8 Statementing
- 9 Mixed Types
- 10 ...500 - reserved for X9
- 501 ...999 - reserved for privately agreed usage

Protocol support: Conditional, Conditional, valid only when the value of <trans_set_id> in the Transaction Set header is Item Group, Financial Data, or Query Request

Business usage: Conditional, shall be present for transaction sets containing item group, financial data, or query requests..

6.3.2.4. Recipient acknowledgment request

The Recipient Acknowledgment Request <recipient_ack_request> element conveys the application sender's request for a specific kind of acknowledgment for this transaction set. It specifies:

1. Under what conditions, if any, acknowledgments are to be generated,
2. Whether a Functional Acknowledgment, an Application Acknowledgment, or both is to be sent, and
3. The type of security to be applied to any requested Application Acknowledgment.

It is composed of three subelements: The acknowledgment condition (<ack_condition>) and the type of acknowledgement requested (<type_of_request>) and <ack_security>. The acknowledgment condition (<ack_condition>) subelement conveys the condition. The type of acknowledgement requested (<type_of_request>) subelement conveys both the type and kind of security mechanism to be applied to Application Acknowledgments, and the <ack_security> specifies the security services that are requested with the acknowledgment.

The absence of this data element conveys the semantics that unsecured Application Acknowledgment is to be generated only on failure.

```
<recipient_ack_request>(01/04) ::= [<ack_condition>] <us>[<type_of_request>] <us> [<ack_security>]
```

Protocol support: Optional.

6.3.2.1. TS length

The Transaction Set Length **<ts_length>** element conveys the total length (in bytes) of the transaction set's contents. It starts from the first byte after this segment, and includes all bytes up to (but excluding) the start of the corresponding **<trans_set_trailer>** (SE). It may be used by a recipient to determine the end of this transaction set.

Size: 02/15

Type: N

<ts_length>(02/15) ::= **<numeric>**

Values: locally calculated

Protocol support: Mandatory

Business usage: Mandatory

6.3.2.2. Transaction set reference identifier

The Transaction Set Reference Identifier **<ts_ref_id>** element conveys a globally unique identifier that is used by FII-translators and FII-system-users for cross-reference purposes. It is formed by concatenating aspects of the Functional Group Header and the Transaction Set Header. The date and time components are expressed in terms of originating FII-translator's *local* information. The date component is the originator's business date, which may be different from the actual processing date.

Size: 16/42

Type: AN

<ts_ref_id>(16/42) ::= -- provided for cross-referencing purposes

<fg_date> "."
<app_sender_id> "."
<function_control_number> "."
<trans_set_control_number>

Values: Concatenation of these data elements:

- Functional Group Date from FG header, whose syntax and semantics are defined in 6.3.1.1.4;
- Application Sender ID from FG header, whose syntax and semantics are defined in 6.3.1.1.1;
- Functional Group Control Number, whose syntax and semantics are defined in 6.3.1.1.6;
- Transaction Set Control Number from TS header, whose syntax and semantics are defined in 6.3.1.3.2.

Protocol support: Mandatory

Business usage: Mandatory

6.3.2.3. Type of transaction set data

The value of Type Of Transaction Set Data **<type_of_ts_data>** element indicates the originating FII-system-user's reason for sending the transaction set.

When the value indicates that the contents of the transaction set is in response to a Query Request, the **<ts_cross_references>** shall contain the **<ts_ref_id>** of the subject query request.

Size: 01/03

Type: N

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Table 36 - General FII extensions: element assignment to transaction sets

General FII Extensions: element assignment to transaction sets	Financial Data TS	Item Group TS	Application Acknowl- edgment TS	Query Requests TS
<general_FII_extensions>	—	—	—	—
<ts_length>	Y	Y	Y	Y
<ts_ref_id>	Y	Y	Y	Y
<type_of_ts_data>	Y	Y	Y	Y
<recipient_ack_request>	Y	Y	Y	Y
<ack_conditions>	Y	Y	Y	Y
<type_of_request>	Y	Y	Y	Y
<send_acknowledgments_to>	Y	Y	—	Y
<fii_id_qualifier>	Y	Y	—	Y
<fii_ack_recipient_id>	Y	Y	—	Y
<ts_cross_references>	Y	Y	Y	Y
<type_of_financial_data>	Y	—	—	—
<count_of_financial_data_items>	Y	—	—	—
<count_of_imaged_items>	—	Y	—	—
<item_group_amount>	—	Y	—	—
<item_group_recipient_id>	—	Y	—	—
<item_subgroup_count>	—	Y	—	—

Y- indicates the applicability of the element

The following table defines the elements contained in the General FII Extensions segment.

Table 37 - GFD: General FII Extensions element names

GFD: General FII extensions element names	Size	Data type	Ref.	Protocol support	Business usage
<general_FII_extensions>	—	—	[GFD]	—	—
<ts_length>	02/15	N	—	M	M
<ts_ref_id>	16/42	AN	—	M	M
<type_of_ts_data>	01/03	N	—	C24	B14
<recipient_ack_request>	01/04	—	—	O	B12
<ack_conditions>	01/01	N	—	O	B12
<type_of_request>	01/02	N	—	O	B12
<ack_security>	01/02	N	—	O	B12
<send_acknowledgments_to>	04/18	—	—	O	B15
<fii_id_qualifier>	02/02	ID	105	M	M
<fii_ack_recipient_id>	01/15	AN	106	M	M
<ts_cross_references>	16/257	AN	—	O	B13
<type_of_financial_data>	01/02	N	—	O	B2
<count_of_financial_data_items>	01/08	N	—	C9	B18
<count_of_imaged_items>	01/08	N	—	C10	B19
<item_group_amount>	01/16	N	—	C10	B2
<item_group_recipient_id>	04/18	AN	—	C10	B20
<item_subgroup_count>	01/08	N	—	C10	B21

The General FII Extensions segment <general_FII_extensions> is composed of a collection of elements. The usage of a specific element differs among transaction set types as indicated in table 30. The following clauses specify the syntax and usage of the elements that comprise this segment:

User registered algorithms: defined as `<identifier_string>{<us><identifier_string>}`

Protocol support: Mandatory .

Business usage: Mandatory .

6.3.1.13.2.2. Algorithm length of key and block size

When present, the `<key_and_or_block_size>` conveys the length of the encypherment algorithm's key and/or block size used to create the digital signature. Its presence depends upon the encypherment algorithm used.

Size: 01/06

Type: N

`<key_and_or_block_size>(01/06) ::= <numeric>`

Values: determined by the signature encryption algorithm (symmetric key encypherment algorithm).

Protocol support: Conditional, valid only if required by or applicable to the security mechanism utilized..

Business usage: Conditional, shall be present only if the algorithm used to encipher the data requires it.

6.3.1.13.2.3. Length of data

The Length of Data `<length_of_data>` element identifies the number of bytes being protected, starting from the first byte of the `<signature>` segment, including all bytes up to, but excluding, the start of the segment following the `<signature>` segment. The syntax of this data element is defined in 6.3.1.7.8.

6.3.2. General FII extensions

General FII Extension `<general_FII_extensions>` is a set of elements unique to the FII usage of a transaction set. It supplements the X12 defined Transaction Set Header to the extent that its values apply to the contents of the entire transaction set. The following table indicates the applicability of each General FII Extensions element by transaction set type.

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- One Transaction Set Header *<ts_header>*, whose syntax is defined in 6.3.1.3. The value of the component element *<trans_set_id>* shall be "STS";
- One Signature Data Segment *<signature_data>*, whose syntax is defined in 6.3.1.13.2;
- One Signature Segment *<signature>*, which conveys the digital Signature whose syntax is defined in 6.3.1.11;
- One Transaction Set Trailer *<ts_trailer>*, whose syntax is defined in 6.3.1.4.

6.3.1.13.2. Signature data segment

The Signature Data Segment *<signature_data>* conveys sufficient information to verify the digital signature's authenticity, i.e., that it was created by the originating financial institution.

Table 35 - SIG: signature data element names

SIG: Signature Data element names	Size	Data type	Ref.	Protocol support	Business usage
<i><signature_data></i>	—	—	[SIG]	—	—
<i><security_orig_name></i>	04/16	AN	824	M	M
<i><security_recip_name></i>	04/16	AN	825	M	M
<i><authent_algorithm_id></i>	01/15	AN	—	M	M
<i><key_and_or_block_size></i>	01/01	N	—	C11	B11
<i><length_of_data></i>	01/16	N	895	O	B11

The following elements are defined in 6.3.1.7:

- *<security_orig_name>*;
- *<security_recip_name>*.

The following definitions pertain to the elements not defined in other parts of this standard:

6.3.1.13.2.1. Authentication algorithm identifiers

When present, the *<authent_algorithm_id>* conveys the identifier of the enciphering algorithm used to create the digital signature.

Note: The set of cryptographic algorithms identified in this standard agree with X9's Cryptographic Policy Standard, March 10, 1994 which is on record with the X9 secretariat.

The use of enciphering schemes may be subject to copyright protection, or patent infringement laws, or legislation. The inclusion of these identifiers in no way constitutes a requirement for their use. Thus, besides registering several data security algorithms commonly used in the US, a general purpose mechanism is also provided for naming the algorithm used between institutions, but not expressly registered herein.

Size: 01/15

Type: AN

<authent_algorithm_id> (01/15) ::= *<rsa_iso9796>* | *<dsa>* | *<identifier_string>* { *<identifier_string>* }

<rsa_iso9796> ::= *<rsa_with_md5>* | *<rsa_with_sha-1>* | *<rsa_with_mdc2>*
 -- from ISO/IEC 9796

<rsa_with_md5> ::= "43.14.3.2.23"
<rsa_with_sha-1> ::= "43.14.3.2.29"
<rsa_with_mdc2> ::= "43.14.3.2.14"

<dsa> ::= *<dsa_with_sha-1>*
<dsa_with_sha-1> ::= "43.14.3.2.27"

- **<no_of_included_sets>** as defined in X12.22 as AK902, an alias for data element # 97; its value is the value of the **<no_include_sets>** (as defined in 6.3.1.2.1) found in the **<fg_trailer>** of the subject functional group being acknowledged;
- **<no_of_received_sets>** as defined in X12.22 as AK903, an alias for data element # 123; its value is a count of the included transaction sets received in the interchange by the FII-translator;
- **<no_of_accepted_sets>** as defined in X12.22 as AK904, an alias for data element # 2; its value indicates the number of the received transaction sets not-rejected by the FII-translator;
- **<fg_syntax_er_cd>** as defined in X12.22 as AK905 - AK909, an alias for data element # 716; the possible values are included herein for reference. At least one occurrence shall be present.

The defined possible values for **<fg_syntax_er_code>** are as follows:

- 1 Functional group not supported;
- 2 Functional group version not supported;
- 3 Functional group trailer missing;
- 4 Group control number in functional group header and functional group trailer do not agree;
- 5 Number of included transaction sets does not match actual count;
- 6 Group control number violates syntax;
- 10 Authentication key name unknown;
- 11 Encryption key name unknown;
- 12 Requested service (Authentication, Non-repudiation, or data protection) not available;
- 13 Unknown security recipient;
- 14 Unknown security originator;
- 15 Syntax error in decrypted text;
- 16 Security not supported;
- 17 Incorrect message length (Encryption and Non-repudiation);
- 18 Message authentication code failed;
- 19 S1E Security End Segment missing for S1S Security Start Segment;
- 20 S1S Security Start Segment missing for S1E Security End Segment;
- 21 S2E Security End Segment missing for S2S Security Start Segment;
- 22 S2S Security Start Segment missing for S2E Security End Segment.

NOTE - Code values 7, 8, and 9 are not defined in X12.22, and hence are not used.

6.3.1.13. Signature data types

The following signature data types are defined by X9 for digitally signing several items in the interchange.

6.3.1.13.1. Signature transaction set

The **<signature_ts>** conveys the digital signature applied to this functional group as created by the originating financial institution. It also conveys information on the creation of the signature. When present, the signature enables a receiving application to authenticate the source of the signed data.

Table 34 - STS: Signature TS element names

STS: Signature TS element names	Size	Data type	Ref.	Protocol support	Business usage
<signature_ts>	—	—	—	—	—
<trans_set_header>	—	—	TS	M	M
<signature_data>	—	—	[SIG]	M	M
<signature>	—	—	BIN	M	M
<trans_set_trailer>	—	—	TE	M	M

The data elements are defined as follows:

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The defined possible values for <trans_set_syntax_error_code> are as follows:

- 1 Transaction set not supported;
- 2 Transaction set trailer missing;
- 3 Transaction set control number in header and trailer do not match;
- 4 Number of included segments does not match actual count;
- 5 One, or more, segments contain errors;
- 6 Missing or invalid transaction set identifier;
- 7 Missing or invalid transaction set control number;
- 8 Authentication key name unknown;
- 9 Encryption key name unknown;
- 10 Requested service (Authentication, Non-repudiation, or data protection) not available;
- 11 Unknown security recipient;
- 12 Incorrect message length (Encryption and Non-repudiation);
- 13 Message authentication code failed;
- 15 Unknown security originator;
- 16 Syntax error in decrypted text;
- 17 Security not supported;
- 19 S1E Security End Segment missing for S1S Security Start Segment;
- 20 S1S Security Start Segment missing for S1E Security End Segment;
- 21 S2E Security End Segment missing for S2S Security Start Segment;
- 22 S2S Security Start Segment missing for S2E Security End Segment.

NOTE - Code values 14 and 18 are not defined in X12.22, and hence are not used.

Table 33 - AK9: FG response trailer element names

AK9: FG response trailer element names	Size	Data type	Ref.	Protocol support	Business usage
<fg_response_trailer>	—	—	AK9	—	—
<functional_group_ack_code>	01/01	ID	AK901	M	M
<no_of_included_sets>	01/06	N	AK902	M	M
<no_of_received_sets>	01/06	N	AK903	M	M
<no_of_accepted_sets>	01/06	N	AK904	M	M
<fg_syntax_er_cd>	01/03	ID	AK905	O	B11
<fg_syntax_er_cd>	01/03	ID	AK906	O	B11
<fg_syntax_er_cd>	01/03	ID	AK907	O	B11
<fg_syntax_er_cd>	01/03	ID	AK908	O	B11
<fg_syntax_er_cd>	01/03	ID	AK909	O	B11

Components of the <trans_set_response_trailer> are defined as follows:

- <functional_group_ack_code> as defined in X12.22 as AK901 is an alias for data element # 715. The possible values are included herein for reference;

The defined possible values for <functional_group_ack_code> are as follows:

- A Accepted;
- E Accepted, but errors were noted;
- M Rejected: Message authentication code (MAC) failed;
- P Partially accepted: at least one transaction set was rejected ;
- R Rejected;
- X Rejected: Content after decryption could not be analyzed.

- **<data_element_ref_no>** as defined in X12.22: AK402, an alias for data element 725, conveys the X12 Data Dictionary's data element number;
- **<element_syntax_er_cd>** as defined in X12.22: AK403, an alias for data element 723, the possible values are included herein for reference;
- **<value_of_bad_element>** as defined in X12.22: AK404, an alias for data element 724, conveys a copy of the bad element's value.

The defined possible values for **<element_syntax_er_cd>** are as follows:

- 1 Mandatory data element missing;
- 2 Conditional required data element missing;
- 3 Too many data elements;
- 4 Data element too short;
- 5 Data element too long;
- 6 Invalid character in data element;
- 7 Invalid code value;
- 8 Invalid date;
- 9 Invalid time;
- 10 Exclusion condition violated.

Table 32 - AK5: Transaction set response trailer element names

AK5: Transaction set response trailer element names	Size	Data type	Ref.	Protocol support	Business usage
<trans_set_response_trailer>	—	—	AK5	—	—
<trans_set_ack_code>	01/01	ID	AK501	M	M
<trans_set_syntax_error_code>	01/03	ID	AK502	O	B11
<trans_set_syntax_error_code>	01/03	ID	AK503	O	B11
<trans_set_syntax_error_code>	01/03	ID	AK504	O	B11
<trans_set_syntax_error_code>	01/03	ID	AK505	O	B11
<trans_set_syntax_error_code>	01/03	ID	AK506	O	B11

Components of the **<trans_set_response_trailer>** are defined as follows:

- **<trans_set_ack_code>** as defined in X12.22: AK501 is an alias for data element 717. The possible values are included herein for reference;

The defined possible values for **<trans_set_ack_code>** are as follows:

- 1 Accepted;
- 2 Accepted, but errors were noted;
- 3 Rejected: Message authentication code (MAC) failed;
- 4 Rejected;
- 5 Rejected: Content after decryption could not be analyzed.

- **<trans_set_syntax_error_code>** as defined in X12.22: AK502 - AK506 is an alias for data element 718. The possible values are included herein for reference.

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Table 30 - AK3: Data segment note element names

AK3: Data segment note element names	Size	Data type	Ref.	Protocol support	Business usage
<data_segment_note>	—	—	AK3	—	—
<segment_id_code>	02/03	AN	AK301	M	M
<seg_position_in_trans_set>	01/06	N	AK302	M	M
<loop_id_code>	01/04	AN	AK303	O	B11
<segment_syntx_er_cd>	01/03	ID	AK304	O	B11
<segment_syntx_er_cd>	01/03	ID	AK305	O	B11
<segment_syntx_er_cd>	01/03	ID	AK306	O	B11
<segment_syntx_er_cd>	01/03	ID	AK307	O	B11
<segment_syntx_er_cd>	01/03	ID	AK308	O	B11

Components of the <trans_set_response_header> and <trans_set_response_trailer> are defined as follows:

- <segment_id_code> as defined in X12.22: AK301, an alias for data element 721 it conveys the value of the data segment's identifier (e.g., "IVS") found in the data segment being acknowledged;
- <seg_position_in_trans_set> as defined in X12.22: AK302, an alias for data element 719, identifies the segment's position relative to the Transaction Set Header;
- <loop_id_code> as defined in X12.22: AK303, an alias for data element 447, conveys the loop identifier if the segment being acknowledged is a Loop Header, or Loop Trailer;
- <segment_syntx_er_cd> as defined in X12.22: AK304 - AK308, an alias for data element 720, the possible values are included herein for reference.

The defined possible values for <segment_syntx_er_cd> are as follows:

- 1 Unrecognized segment identifier;
- 2 Unexpected segment;
- 3 Mandatory segment missing;
- 4 Loop occurrences exceed maximum times;
- 5 Segment exceeds maximum use;
- 6 Segment not in defined transaction set;
- 7 Segment not in proper sequence.

Table 31 - AK4: Data element note element names

AK4: Data element note element names	Size	Data type	Ref.	Protocol support	Business usage
<data_element_note>	—	—	AK4	—	—
<el_position_in_segment>	01/02	N	AK401	M	M
<data_element_ref_no>	01/04	N	AK402	O	B11
<element_syntx_er_cd>	01/03	ID	AK403	M	M
<value_of_bad_element>	01/99	AN	AK404	O	B11

Components of the <data_element_note> are defined as follows:

- <el_position_in_segment> as defined in X12.22: AK401, an alias for data element 722;

Table 27 - Data segment response loop element names

Data segment response loop element names	Size	Data type	Ref.	Protocol support	Business usage
<data_segment_response_loop>	—	—	—	—	—
<data_segment_note>	—	—	AK3	M	M
<data_element_note> ¹	—	—	—	O	B11

1 - max 99 instances

The syntax of components <data_segment_note> and <data_element_note> shall be as defined in 6.3.1.12.4. The data element note <data_element_note> is used to identify the position of a single data element whose value is syntactically incorrect.

6.3.1.12.4. X12 AK1 - AK5, AK9 definitions

The X12 defined data structures for AK1 - AK5 and AK9 segments are included herein for reference. AK1 and AK9 segments identify the subject functional group; AK2 and AK5 identify the subject transaction set; segments AK3 and AK4 identify errors detected at the segment level within the subject transaction set.

Protocol support: Mandatory

Business usage: Mandatory

Table 28 - AK1: FG response header element names

AK1: FG response header element names	Size	Data type	Ref.	Protocol support	Business usage
<fg_response_header>	—	—	AK1	—	—
<functional_group_id>	02/02	AN	AK101	M	M
<function_control_number>	01/09	AN	AK102	M	M

Components of the <fg_response_header> are defined as follows:

- <functional_group_id> as defined in 6.3.1.1.1. of this specification, it conveys the value found in the GS segment (GS01) of the functional group being acknowledged;
- <function_control_number> as defined in 6.3.1.1.6. of this specification, it conveys the value found in the GS segment of the functional group being acknowledged;

Table 29 - AK2: Transaction set response header element names

AK2: Trans set response header element names	Size	Data type	Ref.	Protocol support	Business usage
<trans_set_response_header>	—	—	AK2	—	—
<trans_set_id>	03/03	AN	AK201	M	M
<trans_set_control_number>	04/09	AN	AK202	M	M

Components of the <trans_set_response_header> are defined as follows:

- <trans_set_id> as defined in 6.3.1.3.1. of this specification, it conveys the value found in the ST segment (ST01) of the transaction set being acknowledged;
- <trans_set_control_number> as defined in 6.3.1.3.2. of this specification, it conveys the value found in the ST segment of the transaction set being acknowledged.

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Table 25 - 997: Functional acknowledgment transaction set element names

997: Functional acknowledgment transaction set element names	Size	Data type	Ref.	Protocol support	Business usage
<functional_ack_transaction_set>	—	—	—	—	—
<trans_set_header>	—	—	ST	M	M
<fg_response_header>	—	—	AK1	M	M
<trans_set_response_loop>	—	—	—	M	M
<fg_response_trailer>	—	—	AK3	M	M
<trans_set_trailer>	—	—	SE	M	M

Components of the <functional_ack_transaction_set> are defined as follows:

- The syntax of Transaction Set Header (<trans_set_header>) shall be as defined in 6.3.1.3;
- The syntax of Functional group response header (<fg_response_header>) shall be as defined in 6.3.1.12.4
- The syntax of Transaction Set response loop (<trans_set_response_loop>) shall be as defined in 6.3.1.12.2
- The syntax of Functional group response trailer (<fg_response_trailer>) shall be as defined in 6.3.1.12.4
- The syntax of Transaction Set Trailer (<trans_set_trailer>) shall be as defined in 6.3.1.4.

The value of the Transaction Set Identifier (<trans_set_id>) component of the Transaction Set Header (<trans_set_header>) shall be "997".

6.3.1.12.2. Transaction set response loop

The Transaction Set Response Loop (<trans_set_response_loop>) data structure reports syntax errors detected at the transaction set level for the subject transaction set. It is defined in X12.22 and included here for reference.

Table 26 - Transaction response loop element names

AK2: Transaction set response loop element names	Size	Data type	Ref.	Protocol support	Business usage
<trans_set_response_loop>	—	—	—	—	—
<trans_set_response_header>	—	—	AK2	M	M
<data_segment_response_loop>	—	—	—	M	M
<trans_set_response_trailer>	—	—	AK5	M	M

The syntax of <trans_set_response_header> and <trans_set_response_trailer> shall be as defined in 6.3.1.12.4

6.3.1.12.3. Data segment response loop

The Data Segment Response Loop <segment_response_loop> data structure reports detected syntax errors for data segments within the subject transaction set. It is defined in X12.22, and included here for reference.

Protocol support: Mandatory

Business usage: Mandatory

6.3.1.11.2. Binary data

The Binary Data <binary_data> element conveys the data in its encoding as presented by FII-system-user.

Size: 01/(10¹⁵-1)

Type: B

<binary_data> (01/(10¹⁵ - 1)) ::= <binary>

Values: A stream of unconstrained bytes.

Protocol support: Mandatory

Business usage: Mandatory

6.3.1.12. Functional acknowledgment functional group

The Functional Acknowledgment Functional Group <functional_ack_fg> structure is intended to acknowledge that the received interchange is or (is not) syntactically correct. It comprises a Functional Group Header and a Functional Group Trailer which encapsulate the Transaction Set Header and Trailer. It is defined in X12.22 and included here for reference. It shall always be generated if interchange syntax checking was requested by the originator of the interchange.

Table 24 - FA: Functional acknowledgment functional group element names

FA: Functional acknowledgment element names	Size	Data type	Ref	Protocol support	Business usage
<functional_ack_fg>	—	—	—	—	—
<fg_header>	—	—	GS	M	M
<functional_ack_transaction_set>	—	—	—	M	M
<fg_trailer>	—	—	GE	M	M

Components of the <functional_ack_fg> are defined as follows:

- Functional Group Heading (<fg_header>) is defined in 6.3.1.1;
The value of the Functional Group ID (<functional_group_id>) component of the Functional Group Header (<fg_header>) shall be "FA",
- Functional acknowledgement transaction set <functional_ack_transaction_set> is defined in 6.3.1.12.1
- Functional Group Trailer (<fg_trailer>) is defined in 6.3.1.2

6.3.1.12.1. Functional acknowledgment transaction set

The Functional acknowledgment Transaction Set <functional_ack_transaction_set> conveys the segments which constitute a functional acknowledgment. It comprises a Transaction Set Header and a Transaction Set Trailer which encapsulate the Functional Acknowledgment message segments. It is defined in X12.22 and included here for reference.

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Table 22 - S2E: TS Security trailer element names

TS security trailer element names	Size	Data type	Ref.	Protocol support	Business usage
<ts_security_trailer>	—	—	S2E	—	—
<message_auth_code>	09/09	AN	997	M	M

6.3.1.10.1. Message authentication code

The Message Authentication Code <message_auth_code> contains a MAC that is used by the recipient to validate the identity of the originator and the integrity of the contents of this transaction set. Although the contents of the transaction set is "in the clear", it enables the recipient to detect manipulation of the original contents of this transaction set, i.e., everything after the <tr> in this functional group's S2S segment up to, but excluding the start of this transaction set's S2E segment.

This data element has the same semantics and syntax as 6.3.1.8.1., except that it is being applied to a transaction set.

6.3.1.11. Bin segment

The Binary Segment <bin_segment> conveys the length, and the entire binary entity, as a binary object whose semantics and syntax are understood by the originating and receiving applications in accordance with the requirements of this standard. This standard uses it to represent the structure of a User Data segment, a Financial Data segment, Signature data segment, and a View Binary Data segment. It is defined in X12.22, and included here for reference.

For example, this data element may be used to convey:

- The entire X9.37 structured electronic check data, and the Financial Data Functional Group,
- Individual instances of raster image encoding information within an instance of item views loop, or
- Privately agreed additional selection criteria when used in the context of a Query Request transaction set.

Table 23 - Binary Segment element names

Binary Segment element names	Size	Data type	Ref.	Protocol support	Business usage
<bin_segment>	—	—	BIN	—	—
	01/15	N	784	M	M
	01/10 ¹⁵ -1	B	785	M	M

6.3.1.11.1. Length of binary data

The Length <length_of_binary_data> element contains a value which gives the length of the subsequent binary data in bytes.

Size: 01/15

Type: N (constrained to be an unsigned integer)

<length_of_binary_data> (01/15) ::= <unsigned_integer>

Values: 1 through 10¹⁵-1

6.3.1.9.5. Authentication service code

The Authentication Service Code `<authent_serv_code>` identifies the character set used to encode the MAC. Its values are defined as either X9.9 binary code or X9.9 coded character set.

This data element has the same syntax as 6.3.1.7.5, except that it applies to a transaction set.

```
<authent_serv_code> (01/01) ::= <dd> | <x9_9_binary_data> | <x9_17_std_value>
    <x9_9_binary_data>          ::= "1"
    <x9_17_std_value>           ::= "2"
```

6.3.1.9.6. Encryption key name

The Encryption Key Name `<encryption_key_name>` is the name of the key used to encipher the contents of this functional group.

This data element has the same semantics and syntax as 6.3.1.7.6, except that it applies to a transaction set.

```
<encryption_key_name> (01/16) ::= <string>
```

6.3.1.9.7. Encryption service code

The Encryption Service Code `<encryption_serv_code>` represents the encryption mode and transmission filter specification of filtering binary ciphertext data into transmittable text.

This data element has the same syntax as 6.3.1.7.7, except that it applies to a transaction set.

```
<encryption_serv_code> (01/03) ::= <dd> | <cbc_no_filter> | <cbc_hex_filter> | <cbc_ascii_filter> |
    <cbc_ascii_baudot_filter> | <cbc_mutually_defined_filter> | <cfb_8_no_filter> | <cfb_8_hex_filter> |
    <cfb_8_ascii_filter> | <cfb_8_ascii_baudot_filter>

    <cbc_no_filter>          ::= "20"
    <cbc_hex_filter>         ::= "21"
    <cbc_ascii_filter>       ::= "22"
    <cbc_ascii_baudot_filter> ::= "23"
    <cbc_mutually_defined_filter> ::= "2Z"
    <cfb_8_no_filter>        ::= "40"
    <cfb_8_hex_filter>       ::= "41"
    <cfb_8_ascii_filter>     ::= "42"
    <cfb_8_ascii_baudot_filter> ::= "43"
```

6.3.1.9.8. Length of data

The Length Of Data `<length_of_data>` element is defined as the number of bytes in the contents of the transaction set being protected. It starts from the first byte of the next segment, and includes all bytes up to, but excluding, the start of the S2E segment.

This data element has the same syntax as 6.3.1.7.8., except that it is being applied to a transaction set.

```
<length_of_data> (01/18) ::= <numeric>
```

6.3.1.9.9. Initialization vector

The Initialization Vector `<initialization_vector>` identifies the starting point of encrypted data. This data element has the same syntax as 6.3.1.7.9, except that it applies to a transaction set.

```
<initialization_vector> (16/16) ::= <string>
```

6.3.1.10. Transaction set security trailer

The following Transaction Set Security Trailer (S2E) is used in this standard in Acknowledgments and Query Request transaction sets only. The definition is specified in X12.22 and X12.58. The S2E structure supports both data integrity and data protection.

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Table 21 - S2S: TS security element names

S2S: FG security element names	Size	Data type	Ref.	Protocol support	Business usage
<ts_security_header>	—	—	—	—	—
<security_S2S>	—	—	S2S	—	—
<security_type>	02/02	ID	990	M	M
<security_orig_name>	04/16	AN	824	M	M
<security_recip_name>	04/16	AN	825	M	M
<authent_key_name>	01/16	AN	991	C1	B9
<authent_serv_code>	01/01	ID	992	C1	B9
<encryption_key_name>	01/16	AN	993	C11	B9
<encryption_serv_code>	01/03	ID	994	C11	B9
<length_of_data>	01/18	N	995	C11	B9
<initialization_vector>	18/16	AN	998	C11	B9

The Transaction Set Security Header <security_S2S> is specified here and in annex B. The transaction set security header data elements, defined in X12.22 and X12.58, appear below for reference:

6.3.1.9.1. Security type

The Security Type <security_type> identifies the type of security being applied.

This data element has the same syntax as 6.3.1.7.1, except that it applies to a transaction set.

```

<security_type> (02/02) ::= <id> |
  <authentication_only> | <authentication_and_data_protection> | <data_protection_only>
  <authentication_only> ::= "AA"
  <authentication_and_data_protection> ::= "BB"
  | <data_protection_only> ::= "EE"

```

6.3.1.9.2. Security originator name

The Security Originator Name <security_orig_name> identifies the originator of the security mechanism at the Transaction Set level of the Interchange.

This data element has the same syntax as 6.3.1.7.2, except that it applies to a transaction set.

```

<security_orig_name> (04/16) ::= <string>

```

6.3.1.9.3. Security recipient name

The Security Recipient Name <security_recip_name> identifies the intended recipient of the security mechanism.

This data element has the same semantics and syntax as 6.3.1.7.3., except that it applies to a transaction set.

```

<security_recip_name> (04/16) ::= <string>

```

6.3.1.9.4. Authentication key name

The Authentication Key Name <authent_key_name> identifies the name of the key used to generate the MAC found in the <ts_security_trailer>. Its syntax and values are defined in X12.

This data element has the same syntax as 6.3.1.7.4, except that it applies to a transaction set.

```

<authent_key_name> (01/16) ::= <string>

```

Table 20 - S1E: FG security trailer element names

FG security trailer element names	Size	Data type	Ref.	Protocol support	Business usage
<fg_security_trailer>	-	-	S1E	-	-
<message_auth_code>	09/09	AN	897	M	M

6.3.1.8.1. Message authentication code

The message authentication code <message_auth_code> contains a MAC that is used by the recipient to validate the source and the integrity of the contents of this functional group. Although the contents of the FG is "in the clear," it is designed to enable the recipient to detect manipulation of the original contents of this FG; i.e., everything after the <tr> in this functional group's S1S segment up to, but excluding, the start of this functional group's S1E segment.

Size: 09/09

Type: AN

<message_auth_code> (09/09) ::= <string>

Values: Locally determined

The data element consists of 4 hexadecimal coded characters (i.e., characters from the set 0..9, A..F), a separator character (space), and 4 hexadecimal coded characters. If the data element is not used, it shall be filled only with space characters. The space character shall be encoded as defined in table 6 specification.

Protocol support: Mandatory

Business usage: Mandatory

6.3.1.9. Transaction set security header

The following Transaction Set Security Header <ts_security_header> structure may be used with acknowledgments and Query Requests transaction sets only to convey data protection mechanisms, and simple authentication security mechanisms, like passwords and MAC codes. The definition is specified in X12.22 and X12.58, and included herein for reference. The S2S structure supports both data protection and a minimal form of data integrity.

The syntax and values for the transaction set security header elements are defined in 6.3.1.7.

Strong authentication and non-repudiation facilities are provided in 6.3.1.9 of this specification by means of conveying a digital signature.

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Values: 20 = X9.23 Cipher block chaining (CBC), no filter (binary cipher text)
 21 = X9.23 Cipher block chaining (CBC), Hexadecimal filter
 22 = X9.23 Cipher block chaining (CBC), ASCII filter
 23 = X9.23 Cipher block chaining (CBC), ASCII/B AUDOT filter
 2Z = X9.23 Cipher block chaining (CBC), mutually defined filter
 40 = X9.23 CFB-8 (Cipher Feedback), no filter (binary cipher text)
 41 = X9.23 CFB-8 (Cipher Feedback), Hexadecimal filter
 42 = X9.23 CFB-8 (Cipher Feedback), ASCII filter
 43 = X9.23 CFB-8 (Cipher Feedback), ASCII/BAUDOTfilter

Protocol support: Conditional, valid only if required by or applicable to the security mechanism utilized..

Business usage: Conditional, shall be present only to specify or to convey security features or security mechanisms.

6.3.1.7.8. Length of data

The Length Of Data `<length_of_data>` element is defined as the number of bytes in the contents of the functional group being protected. It starts from the first byte of the next segment, and includes all bytes up to but excluding the start of the S1E segment.

Size: 01/18

Type: N

`<length_of_data> (01/18) ::= <numeric>`

Values: locally determined

Protocol support: Conditional, valid only if required by or applicable to the security mechanism utilized..

~~Business usage: Conditional, shall be present only to specify or to convey security features or security mechanisms.~~

6.3.1.7.9. Initialization vector

The Initialization Vector `<initialization_vector>` element identifies the starting point of encrypted data. A new initialization vector shall be used for each message. It is the archival representation of a 64-bit value expressed in hexadecimal notation (HEX) as 16 ASCII characters from the set of characters (0..9, A..F). The 64-bit value is used to increase security by introducing cryptographic variance and to synchronize cryptographic equipment.

Size: 16/16

Type: AN

`<initialization_vector> (16/16) ::= <string>`

Values: String characters constrained to "0"-"9" and to upper case characters "A" through "F" which are used to represent a hexadecimal value.

Protocol support: Conditional, valid only if required by or applicable to the security mechanism utilized.

Business usage: Conditional, shall be present only to specify or to convey security features or security mechanisms.

6.3.1.8. Functional group security trailer

The following Functional Group Security trailer (S1E) structure is used throughout this standard and is defined in X12.22 and X12.58. The S1S structure supports both data integrity and data protection. It shall be last in the functional group.

6.3.1.7.5. Authentication service code

The Authentication Service Code <authent_serv_code> element identifies the character set used to encode the MAC. Its values are defined as either X9.9 binary code or X9.9 coded character set.

Size: 01/01

Type: ID

```
<authent_serv_code> (01/01) ::= <id> | <x9_9_binary_data> | <x9_17_std_value>
    <x9_9_binary_data>      ::= "1"
    <x9_17_std_value>       ::= "2"
```

Values: 1 means X9.9 binary data

2 means X9.9 coded character set, entire message, no editing (the standard value for X9.17 Authentication with the data element separator expressed as an LF character for the calculation of the MAC).

Protocol support: Conditional, shall be supported if security at the present structural level is supported..

Business usage: Conditional, shall be present only to specify or to convey security features or security mechanisms.

6.3.1.7.6. Encryption key name

The Encryption Key Name <encryption_key_name> element conveys the name of the key used to encipher the contents of this functional group. The name is mutually known to the security originator and the security recipient, is unique for this relationship, and allows a particular key to be specified. Its value is the subject of the Business Practices Agreement.

Size: 01/16

Type: AN

```
<encryption_key_name> (01/16) ::= <string>
```

Values: locally defined and mutually agreed.

Protocol support: Conditional, valid only if required by or applicable to the security mechanism utilized..

Business usage: Conditional, shall be present only to specify or to convey security features or security mechanisms.

6.3.1.7.7. Encryption service code

The Encryption Service Code <encryption_serv_code> element represents the encryption mode and transmission filter specification of filtering binary ciphertext data into transmittable text.

Size: 01/03

Type: ID

```
<encryption_serv_code> (01/03) ::= <id> | <cbc_no_filter> | <cbc_hex_filter> | <cbc_ascii_filter> |
    <cbc_ascii_baudot_filter> | <cbc_mutually_defined_filter> | <cfb_8_no_filter> | <cfb_8_hex_filter> |
    <cfb_8_ascii_filter> | <cfb_8_ascii_baudot_filter>
    <cbc_no_filter>          ::= "20"
    <cbc_hex_filter>         ::= "21"
    <cbc_ascii_filter>       ::= "22"
    <cbc_ascii_baudot_filter> ::= "23"
    <cbc_mutually_defined_filter> ::= "22"
    <cfb_8_no_filter>        ::= "40"
    <cfb_8_hex_filter>       ::= "41"
    <cfb_8_ascii_filter>     ::= "42"
    <cfb_8_ascii_baudot_filter> ::= "43"
```

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<authentication_only> ::= "AA"
 <authentication_and_data_protection> ::= "BB"
 | <data_protection_only> ::= "EE"

Values: *AA* Authentication, no encryption;
 BB Authentication and Encryption;
 EE Encryption, no authentication.

Protocol support: Mandatory

Business usage: Mandatory

6.3.1.7.2. Security originator name

The Security Originator Name <security_orig_name> element identifies the originator of the security mechanism, i.e., the entity that performs authentication or encryption on data to be interchanged.

Size: 04/16

Type: AN

<security_orig_name> (04/16) ::= <string>

Values: Locally determined

Protocol support: Mandatory

Business usage: Mandatory

6.3.1.7.3. Security recipient name

The Security Recipient Name <security_recip_name> element identifies the intended recipient of the security mechanism, i.e., the entity that performs authentication or decryption on data received in an interchange.

Size: 04/16

Type: AN

<security_recip_name> (04/16) ::= <string>

Values: Locally determined

Protocol support: Mandatory

Business usage: Mandatory

6.3.1.7.4. Authentication key name

The authentication key name <authent_key_name> element identifies the name of the key used to generate the message authentication code (MAC) found in the <ig_security_trailer>. Its syntax and values are defined in X12.

Size: 01/16

Type: AN

<authent_key_name> (01/16) ::= <string>

Values:

Protocol support: Conditional, shall be supported if security at the present structural level is supported..

Business usage: Conditional, shall be present only to specify or to convey security features or security mechanisms.

6.3.1.6.1. Loop ID

The Loop ID `<loop_id>` element is a control identifier that names the ending loop type. The value is that of the Loop ID carried in the Loop Header for this loop.

The syntax and values of this data element are that of `<loop_id>` defined in 6.3.1.5.1.

6.3.1.7. Functional group security header

This section 6.3.1.7.1-6.3.1.7.9 defines data elements for the Functional Group Security Header. The syntax and the values of this functional group header are also used in Transaction Set Security Header, see 6.3.1.9.

The following Functional Group Security Header (S1S) structure is used throughout this standard, and is defined in X12.22 and X12.58. The S1S structure supports both data integrity and data protection.

- Depending upon the cryptographic scheme used, it is possible to validate the Data Integrity Check and to authenticate the origin of its transaction set.
- An authentication facility is provided in "signature ts" of this specification by means of conveying a digital signature. When a Signature TS is also present, the value of the `<authent_key_name>` data element also identifies the mechanism used to create the originator's digital signature carried therein.
- Content Confidentiality is not supported by this technique; subsequent segments are passed in the clear.

Table 19 - S1S: FG Security element names

S1S: FG Security element names	Size	Data type	Ref.	Protocol support	Business usage
<code><fg_security_header></code>	—	—	—	—	—
<code><security_S1S></code>	—	—	S1S	—	—
<code><security_type></code>	02/02	ID	990	M	M
<code><security_orig_name></code>	04/16	AN	824	M	M
<code><security_recip_name></code>	04/16	AN	825	M	M
<code><authent_key_name></code>	01/16	AN	991	C1	B9
<code><authent_serv_code></code>	01/01	ID	992	C1	B9
<code><encryption_key_name></code>	01/16	AN	993	C11	B9
<code><encryption_serv_code></code>	01/03	ID	994	C11	B9
<code><length_of_data></code>	01/18	N	995	C11	B9
<code><initialization_vector></code>	16/16	AN	996	C11	B9

The functional group security header `<security_S1S>` is specified in this clause and annex A. The following are the subelements in security S1S:

6.3.1.7.1. Security type

The Security Type `<security_type>` element identifies the type of security being applied.

Size: 02/02

Type: ID

`<security_type> (02/02) ::= <id> |`

`<authentication_only> | <authentication_and_data_protection> | <data_protection_only>`

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The value is that of the **<trans_set_control_number>** carried in the corresponding transaction set header.

<trans_set_control_number>(04/09) ::= <string>

6.3.1.5. Loop header

The following Loop Header (LS) structure is primarily used in the context of imaged items carried in the Item views functional group. Its syntax is as defined in X12.22. It defines the beginning of each loop, which may contain item subgroups, item data, or item views. There shall be one loop header for each loop, and it shall be first in the loop. All loops are limited to 999,999 iterations unless otherwise explicitly specified in this standard.

Table 17 - LS: Loop header element names

LS: Loop header element names	Size	Data type	Ref.	Protocol support	Business usage
<loop_header>	—	—	LS	—	—
<loop_id>	01/04	AN	447	M	M

The following define the elements in the loop header:

6.3.1.5.1. Loop ID

The Loop ID **<loop_id>** element is a control identifier that names the current loop type in the Loop Header. The same syntax, semantics, and value are used in the loop trailer, see 6.3.1.6.1.

Size: 01/04

Type: AN

<loop_id>(01/04) ::= <string> | -- Only X9.46 registered values
<item_subgroup_or_query_req> | <item_data> | <item_view>
<item_subgroup_or_query_req> ::= "1"
<item_data> ::= "2"
<item_view> ::= "3"

Values: "1" means Item Subgroup or Query Request, depending on functional group type.

"2" means Item Data

"3" means Item View

Protocol support: Mandatory

Business usage: Mandatory

6.3.1.6. Loop trailer

The following Loop Trailer (LE) structure is used throughout this standard and is as defined in X12.22. It defines the end of a loop. It shall be last in a loop. There shall be one for each loop, and it ends the current loop.

Table 18 - LE: Loop trailer element names

LE: Loop trailer: element names	Size	Data type	Ref.	Protocol support	Business usage
<loop_trailer>	—	—	LE	—	—
<loop_id>	01/04	AN	447	M	M

The following are the data elements in the loop trailer:

6.3.1.3.2 Transaction set control number

The Transaction Set Control Number <trans_set_control_number> element conveys a value used to provide matching control between the transaction set header and the transaction set trailer. Its value, determined by the originator of the transaction set, is unique across all transaction sets within a specific functional group. The value assigned in the header must match the value assigned in the trailer, see 6.3.1.4.2.

Size: 04/09

Type: AN

<trans_set_control_number>(04/09) ::= <string>

Values: The value is to be the same value as carried in the corresponding Transaction Set Header and Trailer

Protocol support: Mandatory

Business usage: Mandatory

6.3.1.4. Transaction set trailer

The following Transaction Set Trailer (SE) structure is used throughout this standard to identify the end of a named transaction set. The <no_of_included_segments> provides a level of control to indicate the total number of segments included in the transaction set, which is named by the value of <trans_set_control_number>. Its syntax is defined in X12.22 and included here for reference.

Table 16 - SE: TS trailer data element names

SE - Transaction set trailer element names	Size	Data type	Ref.	Protocol support	Business usage
<trans_set_trailer>	—	—	SE	—	—
<number_of_included_segments>	01/10	N	96	M	M
<trans_set_control_number>	04/09	AN	329	M	M

The Transaction Set Trailer <trans_set_trailer> is provided for control purposes. It shall be last in the transaction set. It is composed of the following subelements:

6.3.1.4.1. Number of included segments

The Number of Included Segments <number_of_included_segments> element conveys a count of the total number of segments included in this transaction set. It is provided for control purposes.

The value shall include the Transaction Set Trailer, Header, and every segment in between.

Size: 01/10

Type: N

<number_of_included_segments> (01/10)::= <numeric>

Values: Calculated value

Protocol support: Mandatory

Business usage: Mandatory

6.3.1.4.2. Transaction set control number

The Transaction Set Control Number element is provided to correlate a Transaction Set Trailer to its corresponding Transaction Set Header. Syntax and semantics for the transaction set control number are defined in 6.3.1.3.2. The value is the same as the value carried in the transaction set control number in the transaction set header.

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The syntax is defined in 6.3.1.1.6.

Values: Shall match the **<function_control_number>** in the associated functional group header.

Protocol support: Mandatory

Business usage: Mandatory

6.3.1.3. Transaction set header

The following Transaction Set Header (ST) structure is used throughout this standard to identify the start of a group of segments that share a common bond. Its syntax is defined in X12.22 and included here for reference.

Table 15 - ST: Transaction set header element names

ST -Transaction Set Header element names	Size	Data type	Ref.	Protocol support	Business usage
<trans_set_header>	—	—	ST	—	—
<trans_set_id>	03/03	AN	143	M	M
<trans_set_control_number>	04/09	AN	329	M	M

The Transaction Set Header is used to indicate the information common to the set of transactions. It shall be first in the transaction set.

6.3.1.3.1. Transaction set ID

The Transaction Set ID **<trans_set_id>** element conveys a value which identifies the type of this transaction set. Its type shall be selected in accordance with the X12 function header type that precedes it.

Size: 03/03

Type: AN

<trans_set_id> (03/03) ::= **<string>** | — *Only X9.46 registered values are used*
<financial_data_set> | **<item_group_set>** | **<application_ack_set>** | **<query_requests_set>** |
<signatures_set> | **<functional_ack_set>**
<financial_data_set> ::= "FTS"
<item_group_set> ::= "ITS"
<application_ack_set> ::= "ATS"
<query_requests_set> ::= "QTS"
<signatures_set> ::= "STS"
<functional_ack_set> ::= "997" — *Imported from X12 - 997 functional acknowledgment*

Values: "FTS" means Financial Data transaction set
 "ITS" means Item Group transaction set
 "ATS" means Application Acknowledgment transaction set
 "QTS" means Query Request transaction set
 "STS" means Signature transaction set
 "997" means Functional Acknowledgment transaction set

Protocol support: Mandatory

Business usage: Mandatory

6.3.1.1.8. Version

The Version **<version>** identifies the X12 and X9 version and release numbers, respectively, to which this functional group conforms.

Size: 01/12

Type: AN

<version> (01/12) ::= **<string>** -- bytes 1-6: use the value "003050"
-- bytes 7-12: use the values "001001"

Values: Character positions 1-3: "003" to indicate X12 (1994) version,
Character positions 4-6: "050" to indicate X12 (1994) release,
Character positions 7-9: "001" to indicate the 1995 version of the X9.46 standard,
Character positions 10-12: "001" to indicate the 1995 release of the X9.46 standard.

Protocol support: Mandatory

Business usage: Mandatory

6.3.1.2. Functional group trailer

The following Functional Group Trailer (GE) structure is used throughout this standard to identify the end of a named functional group. The **<no_included_sets>** provide a level of control to indicate the originator's perception of the number of sets of transactions included in the functional group, which is named by the value of **<function_control_number>**. Its syntax is defined in X12.22 and included here for reference.

Table 14 - GE: Function trailer element names

GE-Function-Trailer element names	Size	Data type	Ref.	Protocol support	Business usage
<fg_trailer>	—	—	GE	—	—
<no_included_sets>	01/06	N	97	M	M
<function_control_number>	01/09	N	28	M	M

The function trailer **<fg_trailer>** is the trailer of the function group. It shall be last in the functional group.

6.3.1.2.1. Number of included sets

The Number Of Included Sets **<no_included_sets>** conveys a value containing the count of the number of transaction sets included in this functional group. It is provided by the application sender, and used for control purposes by the application receiver to ensure receipt of the correct number of transaction sets.

Size: 01/06

Type: N

<no_included_sets> (01/06) ::= **<numeric>**

Values: Count of number of transaction sets

Protocol support: Mandatory

Business usage: Mandatory

6.3.1.2.2. Functional group control number

The Functional Group Control Number **<function_control_number>** conveys a value which is used to control the functional group. It shall have the same value as its counterpart in the associated **<fg_header>**.

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Protocol support: Mandatory

6.3.1.1.5. Functional group time

The Functional Group Time **<fg_time>** specifies the creation time of this functional group. The time value represents the *local* time of the institution creating this functional group.

For the purpose of this standard, the value shall always include values for hours, minutes and seconds, i.e., contain six digits.

Size: 04/06, this standard shall use 6 digits

Type: TM

<fg_time> (04/08) ::= <time> -- The originator's LOCAL time, not GMT

Values: HHMM[SSFF where HH represents hour, MM represents minutes, [SS] represents seconds. Per X12, the inclusion of seconds is optional as indicated by the [] notation.

HH shall be 00 through 23

MM shall be 00 through 59

SS shall be 00 through 59

FF shall be 00 through 99

Protocol support: Mandatory

Business usage: Mandatory

6.3.1.1.6. Functional group control number

The Functional Group Control Number **<function_control_number>** conveys a unique value which is used to control the functional group. It shall be unique within this interchange, and across all interchanges originated by a sender for a specific functional group date. Its value is determined by the originator of the functional group.

The value is also used in Functional Group Trailer, see 6.3.1.2.2.

Size: 01/09

Type: N

<function_control_number> (01/09) ::= <numeric>

Values: Locally determined and assigned.

Protocol support: Mandatory

Business usage: Mandatory

6.3.1.1.7. Standard

The Standard **<standard>** identifies the standard to which the functional group conforms.

Size: 01/02

Type: AN

<standard> (01/02) ::= <string> -- the value "X9" is used

Values: "X9"

Protocol support: Mandatory

Business usage: Mandatory

"73" means Query Requests
 "80 through 99" reserved for private types
 "FA" means Functional Acknowledgment

Protocol support: Mandatory

Business usage: Mandatory

6.3.1.1.2. Application sender ID

The Application Sender ID **<app_sender_id>** identifies the originator of the functional group's data. The value is registered by the same authority as the sender's **<inter_id_qualifier>** value defined in 6.2.3.3.1.

If the sender is a bank (i.e. the **<inter_id_qualifier>** in the ISA header is "17"), the application sender ID shall be the bank's routing number. If the value of **<inter_id_qualifier>** is other than "17", the value of this data element shall be as registered by that entity.

Size: 02/15

Type: AN

<app_sender_id> (02/15) ::= **<string>**

Values: 9 digits long.

Protocol support: Mandatory

Business usage: Mandatory

6.3.1.1.3. Application receiver ID

The Application Receiver ID **<app_receiver_id>** identifies the receiver of the functional group's data. The value is registered by the same authority as the receiver's **<inter_id_qualifier>** value defined in 6.2.3.4.1.

If the receiver is a bank (i.e. the **<inter_id_qualifier>** in the ISA header is "17"), the application receiver ID shall be the bank's routing number. If the value of **<inter_id_qualifier>** is other than 17, the value of this data element shall be as registered by that entity.

Size: 02/15

Type: AN

<app_receiver_id> (02/15) ::= **<string>**

Values: 9 digits long.

Protocol support: Mandatory

Business usage: Mandatory

6.3.1.1.4. Functional group date

The Functional Group Date **<fg_date>** specifies the creation date of this functional group.

Size: 06/06

Type: DT

<fg_date> (06/06) ::= **<date>**

Values: YYMMDD where YY represents the year, MM represents the month, and DD represents the day:

YY shall be 00 through 99;

MM shall be 01 through 12;

DD shall be 01 through 31.

Protocol support: Mandatory

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6.3 Common data structure

Each functional group defined in this standard is a structure consisting of Common X12 Elements, General Fill Extensions, and specific elements for that particular type of functional group.

6.3.1. Common X12 structures

All of the structures in this clause have the syntax specified in X12.22. If no values are specified herein, the values are as defined in X12.22. If the values herein differ from those in X12.22, the values herein take precedence.

6.3.1.1. GS functional group header

The following Functional Group Header (GS) is used throughout this standard to identify the start of a set of transactions which share a common bond. Its syntax is defined in X12.22 and included here for reference.

Table 13 - GS: Function header element names

GS -Function Header element names	Size	Data type	Ref.	Protocol support	Business usage
<fg_header>	—	—	GS	—	—
<functional_group_id>	02/02	AN	479	M	M
<app_sender_id>	02/15	AN	142	M	M
<app_receiver_id>	02/15	AN	124	M	M
<fg_date>	06/06	DT	373	M	M
<fg_time>	04/08	TM	337	M	M
<function_control_number>	01/09	N	29	M	M
<standard>	01/02	AN	455	M	M
<version>	01/12	AN	480	M	M

The function header <fg_header> indicates the beginning of the functional group. It contains information which applies to the entire functional group. It shall be first in the functional group.

6.3.1.1.1. Functional group ID

The Functional Group ID <functional_group_id> conveys a value containing the identity of the functional group.

Size: 02/02

Type: AN

<functional_group_id>(02/02) ::= <string> | — X9.46 registered values only
 <financial_data_group> | <item_views_group> | <application_ack_group> |
 <query_requests_group> | <functional_ack_group> | <private_types>
 <financial_data_group> ::= "70"
 <item_views_group> ::= "71"
 <application_ack_group> ::= "72"
 <query_requests_group> ::= "73"
 <functional_ack_group> ::= "FA" — Imported from X12 - 997 functional acknowledgment
 <private_types> ::= "80" | ... | "99"

Values:

"70" means Financial Data

"71" means Item Views

"72" means Application Acknowledgment

6.2.3.10 Subelement separator

The Subelement Separator **<subelement_separator>** provides the capability to indicate a value for the subelement separator. This standard specifies it to be a certain value, as described in 6.1.5.

Size: 01/01

Type: AN

<subelement_separator> (01/01) ::= **<string>**— data element I15 : X12.5

Values: See **<us>** in clause 6.1.5 for value.

Protocol support: Mandatory

Business usage: Mandatory

6.2.4. X12 IEA trailer

The X12 IEA Trailer **<inter_trailer>** structure contains management and control information for an interchange. It shall always be last in an interchange. It is created by the originator of the interchange. All X12 IEA trailer fields shall have values, as required by X12.5, and specified in this clause and annex B of this standard. The following table specifies the data elements in an X12 IEA trailer.

Table 12 - X12 IEA trailer element names

X12 IEA trailer element name	Size	Data type	Ref.	Protocol support	Business usage
<inter_trailer>	—	—	IEA	—	—
<number_groups>	01/05	N	I16	M	M
<inter_control>	09/09	N	I12	M	M

The X12 IEA trailer is defined in X12.22 and included here for reference.

6.2.4.1. Number of included functional groups

The number of included functional groups **<number_groups>** is a count of functional groups contained in this interchange. The value is set by the creator of the interchange.

Size: 01/05

Type: N

<number_groups> (01/05) ::= **<numeric>**— data element I16 : X12.5

Protocol support: Mandatory

Business usage: Mandatory

6.2.4.2. Interchange control

The Interchange Control **<inter_control>** provides control for the interchange by conveying a unique identifier that names the interchange. It shall have the same value as **<inter_control>** in the associated X12 ISA header.

The syntax and semantics are defined in 6.2.3.7.

<inter_control> (09/09) ::= **<numeric>**— data element I12 : X12.5

Protocol support: Mandatory

Business usage: Mandatory

X9.46-1997**6.2.3.7 Interchange control**

The Interchange Control **<inter_control>** is an originator-determined numeric value that is unique to this interchange, across all interchanges generated by the same originating institution. It shall be the same value as in the X12 IEA Trailer.

When functional acknowledgments have been requested, the receiver of this interchange shall place this same value in the acknowledgment's appropriate segment. Together with the sender ID, it uniquely identifies the interchange contents to an acknowledgment receiver.

Size: 09/09

Type: N

<inter_control> (09/09) ::= **<numeric>**— data element I12 : X12.5

Values: Determined by sender.

Protocol support: Mandatory

Business usage: Mandatory

6.2.3.8 Acknowledgment requested

The Acknowledgment Requested **<ack_requested>** provides the capability to request a receiving FI—translator to acknowledge that the interchange was received.

X9 does not use this level of acknowledgment because it is not specific enough. Instead, this standard uses a Functional Acknowledgment and Application Acknowledgment mechanism to indicate reception of an interchange.

Size: 01/01

Type: ID

<ack_requested> (01/01) ::= **<id>**— data element I13 : X12.5

Values: "0" shall be used. This indicates that this level of acknowledgment was NOT requested.

Protocol support: Mandatory

Business usage: Mandatory

6.2.3.9 Test indicator

The Test Indicator **<test_indicator>** provides the capability to indicate if this is a test interchange. It has usefulness during early stages of implementation of interchanges.

Size: 01/01

Type: ID

<test_indicator> (01/01) ::= **<id>**— data element I14 : X12.5

Values: "P" means "production": and
"T" means "test"

Any other value means "test".

Protocol support: Mandatory

Business usage: Mandatory

6.2.3.5.2 Interchange time

The Interchange Time **<inter_time>** is a value which indicates the time the originator created the interchange. The value shall represent the originator's *local* time.

Size: 04/04

Type: TM

Format:

Values: *HHMM* where HH conveys the local hour, and MM conveys the local minutes:

HH shall be 00 through 23;

MM shall be 00 through 59.

Protocol support: Mandatory

Business usage: Mandatory

6.2.3.6 Standard version

The Standard Version **<standard_version>** conveys the identity of the version of X12.5 being used in the subject FII. It has two elements: standards identifier and version ID.

<standard_version> ::= **<standards_identifier>****<gs>****<version_id>**

<standards_identifier> (01/01) ::= **<id>** -- data element I10 : X12.5

<version_id> (05/05) ::= **<id>** -- value is 00305, data element I11 : X12.5

Protocol support: Mandatory

Business usage: Mandatory

6.2.3.6.1 Standards Identifier

The Standards Identifier **<standards_identifier>** indicates the EDI community creating the interchange standard.

Size: 01/01

Type: ID

Values: Shall be "U" (US EDI Community).

Protocol support: Mandatory

Business usage: Mandatory

6.2.3.6.2 Version ID

The Version ID **<version_id>** conveys a value which indicates the version, as specified by X12.5 and X12.22.

Size: 05/05

Type: ID

Values: Shall be "00305" to indicate the *X12 Draft Standard for Trial Use Approved for Publication by ASN12 Procedures Review Board through December 1994*.

Protocol support: Mandatory

Business usage: Mandatory

X9.46-1997**6.2.3.4.1 Interchange ID qualifier**

The Interchange ID Qualifier **<inter_id_qualifier>** is a value indicating the registry where the receiver ID value is registered. The syntax is defined in 6.2.3.3.1.

Size: 02/02

Type: ID

Values: See 6.2.3.3.1 for values.

Protocol support: Mandatory

Business usage: Mandatory

6.2.3.4.2 Receiver ID

The Receiver ID **<receiver_id>** is a value assigned by the registrar which defines the receiver. If Interchange ID qualifier is "17", then the value is the bank's routing number.

Size: 15/15

Type: AN

Values: Bank routing number, or the recipient's name if the value of the **<inter_id_qualifier>** is other than "17".

Protocol support: Mandatory

Business usage: Mandatory

6.2.3.5 Interchange date and time

The Interchange Date and Time **<inter_date_time>** associated with the interchange represents two elements: Interchange Date and Interchange Time. For X9 purposes, the interchange date and time represent the local date and time of the originator.

<inter_date_time> ::= **<inter_date>** **<gs>** **<inter_time>**
<inter_date>(06/06) ::= **<date>**— data element 108 : X12.5
<inter_time>(04/04) ::= **<hour>****<minute>**— data element 109 : X12.5

Protocol support: Mandatory

Business usage: Mandatory

6.2.3.5.1 Interchange date

The Interchange Date **<inter_date>** is a value indicating the originator's business date when the interchange was created.

Size: 06/06

Type: DT

Values: YYMMDD where YY represents the year, MM represents the month, and DD represents the day:

YY shall be 00 through 99
 MM shall be 01 through 12
 DD shall be 01 through 31

Protocol support: Mandatory

Business usage: Mandatory

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<sender> ::= **<inter_id_qualifier>** **<gs>** **<sender_id>**
<inter_id_qualifier> (02/02) ::= **<id>** -- data element 105 : X12.5
<sender_id> (15/15) ::= **<string>** -- data element 106 : X12.5
<inter_id_qualifier> (02/02) ::= **<id>** -- data element 105 : X12.5

Protocol support: Mandatory

Business usage: Mandatory

6.2.3.3.1 Interchange ID qualifier

The Interchange ID Qualifier **<inter_id_qualifier>** is a value indicating the registry where the sender ID value is registered.

Size: 02/02

Type: ID

Values: X12 registered values.

<inter_id_qualifier> (02/02) ::= **<id>** -- data element 105 : X12.5

- 01 (per X12.22) indicates that the sender id value is a DUN's number (Dun and Bradstreet).
- 17 (per X12.22) indicates that the Sender ID value is a routing number including a Check Digit (Thomson Bank Registry).

Protocol support: Mandatory

Business usage: Mandatory

6.2.3.3.2 Sender ID

The Sender ID **<sender_id>** is a value assigned by the registrar which defines the sender. If interchange ID qualifier is "17", then the value is the bank's routing number. Other values are defined in X12.5

Size: 15/15

Type: AN

Values: Bank routing number, or the originator's name if the value of the **<inter_id_qualifier>** is other than "17".

Protocol support: Mandatory

Business usage: Mandatory

6.2.3.4 Receiver

The Receiver **<receiver>** associated with the interchange has two elements: Interchange ID Qualifier and Receiver ID.

<receiver> ::= **<inter_id_qualifier>** **<gs>** **<receiver_id>**
<inter_id_qualifier> (02/02) ::= **<id>** -- data element 105 : X12.5
<receiver_id> (15/15) ::= **<string>** -- data element 107 : X12.5

Protocol support: Mandatory

Business usage: Mandatory

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Values: Shall be "00" indicating that no meaningful information is in ISA header field I02, i.e., No authorization information present.

Protocol support: Mandatory

Business usage: Mandatory

6.2.3.1.2 Authorization Information

The Authorization Information <authorization_info> is a value which defines the authorization.

Size: 10/10

Type: AN

Values: All zeros

Protocol support: Mandatory

Business usage: Mandatory

6.2.3.2 Security

The Security <security> associated with the interchange has two elements: security qualifier and security information.

<security>	::= <security_qualifier> <gs> <security_info>
<security_qualifier> (02/02)	::= <id> -- data element I03 : X12.5
<security_info> (10/10)	::= <string> -- data element I04 : X12.5

Protocol support: Mandatory

Business usage: Mandatory

6.2.3.2.1 Security qualifier

The security qualifier <security_qualifier> is a value indicating the meaning of the security information.

Size: 02/02

Type: ID

Values: Shall be "00" indicating that no meaningful information is in ISA header field I04, i.e., No security information present.

Protocol support: Mandatory

Business usage: Mandatory

6.2.3.2.2 Security Information

The security information <security_info> is a value which defines the security information.

Size: 10/10

Type: AN

Values: All zeros.

Protocol support: Mandatory

Business usage: Mandatory

6.2.3.3 Sender

The Sender <sender> associated with the interchange has two elements: interchange ID qualifier and sender ID.

Table 11 - X12 ISA header element names

ISA header field element names	Size	Data type	Ref	Protocol support	Business usage
<inter_header>	—	—	ISA	—	—
<authorization>	—	—	—	—	—
<authorization_qualifier>	02/02	ID	I01	M	M
<authorization_info>	10/10	AN	I02	M	M
<security>	—	—	—	—	—
<security_qualifier>	02/02	ID	I03	M	M
<security_info>	10/10	AN	I04	M	M
<sender>	—	—	—	—	—
<inter_id_qualifier>	02/02	ID	I05	M	M
<sender_id>	15/15	AN	I06	M	M
<receiver>	—	—	—	—	—
<inter_id_qualifier>	02/02	ID	I05	M	M
<receiver_id>	15/15	AN	I07	M	M
<inter_date_time>	—	—	—	—	—
<inter_date>	06/06	DT	I08	M	M
<inter_time>	04/04	TM	I09	M	M
<standard_version>	—	—	—	—	—
<standards_identifier>	01/01	ID	I10	M	M
<version_id>	03/03	ID	I11	M	M
<inter_control>	09/09	N	I12	M	M
<ack_requested>	01/01	ID	I13	M	M
<test_indicator>	01/01	ID	I14	M	M
<subelement_separator>	01/01	AN	I15	M	M

The following definitions of the elements and subelements comprising the ISA header are defined in X12.22, and are included for reference. Unlike other subelements, the ISA subelements always are separated using the <gs> separator character. Each element that has an X12 reference is separated with a data element separator (<gs>).

6.2.3.1 Authorization

This is the Authorization <authorization> associated with the interchange. It has two elements: <authorization_qualifier> and <authorization_info>.

<authorization> ::= <authorization_qualifier> <gs> <authorization_info>

<authorization_qualifier> (02/02) ::= <id>— data element I01 : X12.5

<authorization_info> (10/10) ::= <string>— data element I02 : X12.5

Protocol support: Mandatory

Business usage: Mandatory

6.2.3.1.1 Authorization qualifier

The Authorization Qualifier <authorization_qualifier> is a value indicating the meaning of the authorization information.

Size: 02/02

Type: ID

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Zero or more Query Requests functional groups may be present in each interchange. Additionally, this functional group provides a mechanism to restart a search at a specific reference point. The *restart mechanism* enables the originator to limit 1) the range of possible results, and 2) the likelihood of run-away search requests.

Protocol support: Optional.

Business usage: Conditional, shall be present if a Query Requests Functional Group is present in the interchange

6.2.2.7 Interchange trailer

The Interchange Trailer <inter_trailer> contains the management and control information for the interchange. It shall be last in the interchange, and is paired with an X12 ISA Header. Its syntax is specified in 6.2.4.

Protocol support: Mandatory

Business usage: Mandatory

6.2.3 X12 ISA header

The X12 ISA Header <inter_header> contains the management and control information for an interchange. It always is first in an interchange. There is only one in each interchange. It is created by the originator of the interchange. All X12 ISA Header data elements shall have values, as required by X12.5 and specified in this clause and annex D of this standard.

Protocol support: Optional.

Business usage: Conditional, shall be present if views of imaged items are in the interchange.

6.2.2.4 Functional acknowledgment functional group

The Functional Acknowledgment functional group **<functional_ack_fg>** contains the requested acknowledgment information for a functional group, transaction set, or data segment, as illustrated in figure 10. It shall be used by a receiving FII-translator to report the results of a syntax level check of the interchange. This standard utilizes the X12 Functional Acknowledgment (FA) to provide the requested positive, or negative, syntactic acknowledgment.

Zero or more Functional Acknowledgment functional groups may be present in each interchange.

Unlike the X12 EDI definition, this standard defines a mechanism in the *general FII extensions* for requesting X12 functional Acknowledgment. Thus, it shall only be generated in response to a request by the originator of the subject FII.

Protocol support: Optional.

Business usage: Conditional, shall be present if a Functional Acknowledgement is conveyed in the interchange.

6.2.2.5 Application acknowledgment functional group

The Application Acknowledgment functional group **<application_ack_fg>** contains the requested acknowledgment information for a functional group, transaction set, or data segment level, as illustrated in figure 11. It conveys the receiving FII-system-user application's acceptance or rejection of the interchange, or its components, after evaluating the semantics of the contents of the interchange.

Zero or more Application Acknowledgment functional groups may be present in each interchange. An Application Acknowledgment shall only be generated in response to a request by the originator of the subject FII.

Protocol support: Optional.

Business usage: Conditional, shall be present if an application acknowledgement is conveyed in the interchange.

6.2.2.6 Query requests functional group

The Query Requests functional group **<query_requests_fg>** contains requests for views of imaged items, information associated with a view, imaged item, and groupings of imaged items, as well as requests to cancel outstanding queries. The structure shall be as illustrated in figure 12.

The Query Requests functional group supports the following functions:

- *Retrieve based on specific key(s), or image item names,*
- *Retrieve based on general search criteria, and*
- *Cancel a "not yet completed" query request*
- *Cancel a previously sent Financial Data, or Item Views transmission, or portion thereof.*

A FII-system-user also may specify the desired query operation results:

- *Retrieve the actual images (or portions of an imaged item), item data, or privately understood data, for the imaged items found matching several ranges of selection criteria such as amount, serial numbers, etc.,*
- *The transport medium to be used to return the data found meeting the search and retrieve selection criteria, and*
- *whether the results should be secured (signed, or MAC'd)*

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Table 10 - Financial image interchange structure

FII structure	Size	Data type	Ref.	Protocol support	Business usage
<fii_structure>	—	—	—	—	—
<inter_header>	—	—	ISA	M	M
<financial_data_fg>	—	—	—	O	B4
<item_views_fg>	—	—	—	O	B5
<functional_ack_fg>	—	—	—	O	B6
<application_ack_fg>	—	—	—	O	B7
<query_request_fg>	—	—	—	O	B8
<inter_trailer>	—	—	IEA	M	M

The FII structure <fii_structure> consists of the following *edi* structures:

6.2.2.1 Interchange header

The interchange header <inter_header> contains information needed to manage and control the interchange. It shall be first in the interchange.

Protocol support: Mandatory

Business usage: Mandatory

6.2.2.2 Financial data functional group

The Financial Data functional group <financial_data_fg> contains electronic check exchange data. Zero or more financial data functional groups may be present in each interchange. For example, this functional group may contain one or more transaction sets, where each transaction set may contain a financial data segment that conveys a X9.37 file. The structure shall be as illustrated in figure 8. The syntax can be found in 6.4.1.

Protocol support: Optional.

Business usage: Conditional, shall be present if financial data is in the interchange.

6.2.2.3 Item views functional group

The Item Views functional group <item_views_fg> contains views of items and processing information associated with a view, imaged item, and groupings of imaged items. The structure shall be as illustrated in figure 9. The syntax can be found in 6.4.2.

In the context of a query response, its contents comprise:

- One or more views of a single imaged item;
- One or more views of multiple imaged items;
- Item information about one or more imaged items (e.g., image keys, or compression indicators);
- User data only about one or more imaged items.

In the context of forward or return processing, its contents may contain:

- Some, all, or none of the images associated with a cash letter;
- One or multiple subgroup(s) of images, not associated with any ECE cash letter.

Zero or more Item Views functional groups may be present in each interchange.

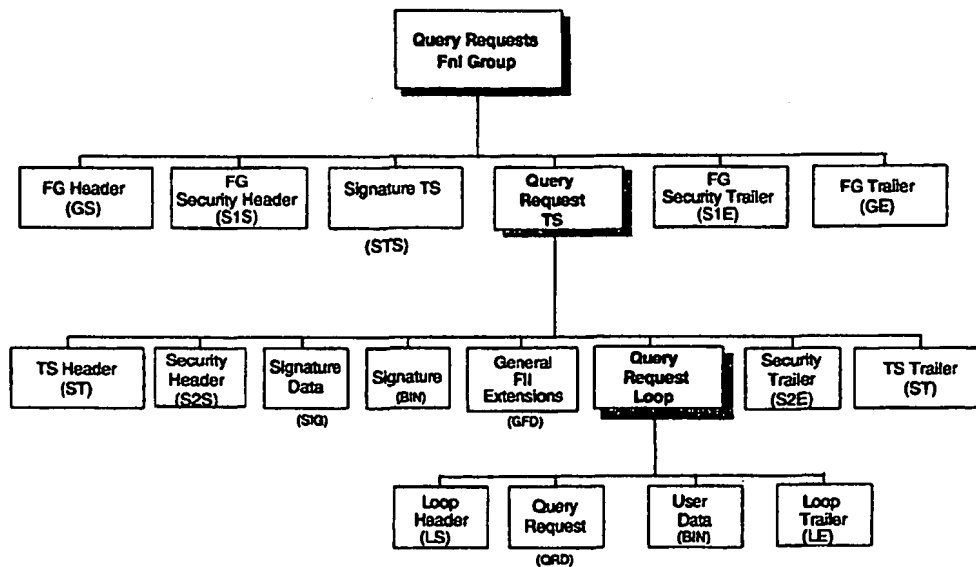


Figure 12 - Query requests functional group model

It contains one or more *Query Request Transaction Sets* within the functional group, and optional security related features as follows:

Query Requests Functional Group:
 Functional Group Header
 Functional Group Security Header
 Signature Transaction Set
 Query Request Transaction Set
 Functional Group Security Trailer
 Functional Group Trailer

Each *Query Request Transaction Set* shall have one *General FII Extension* segment, and one or more *query request* data segments:

Query Request Transaction Set:
 Transaction Set Header
 Transaction Security Header
 Signature Data
 Signature
 General FII Extensions
 Query Request data segment(s)
 User Data segment
 Transaction Security Trailer
 Transaction Set Trailer

6.2.2. Top level FII structure

Table 10 describes the top level Financial Image Interchange structure. When *different* types of functional groups are present in a single FII, they shall appear in the order indicated in table 10. Each FII conformant interchange shall contain at least one type of Functional Group defined in this standard. Functional groups of the *same* type may appear in any order.

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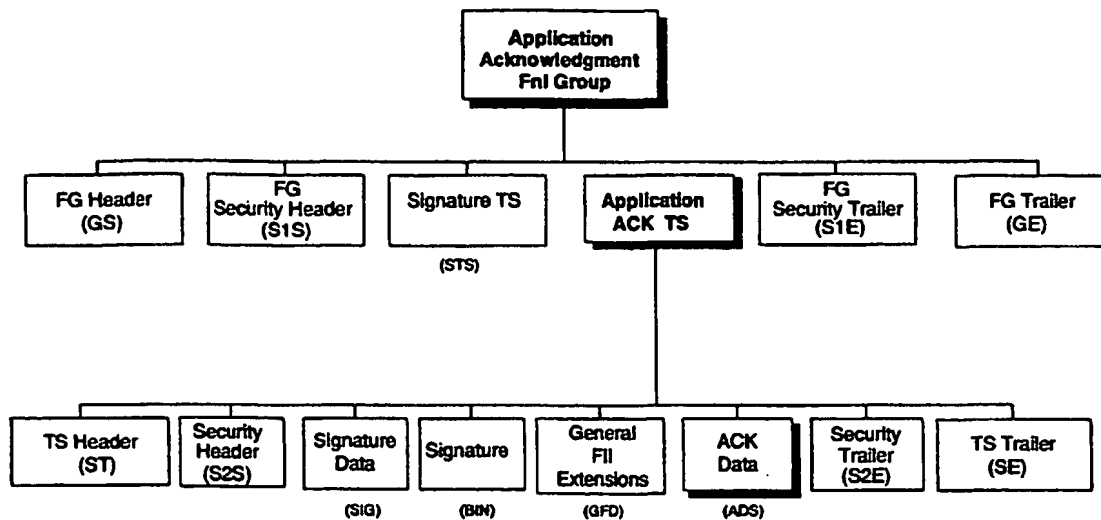


Figure 11 - Application acknowledgment functional group model

It contains one or more *Application Acknowledgment transaction sets* within the functional group as follows:

Application Acknowledgment Functional Group:
 Functional Group Header
 Functional Group Security Header
 Signature Transaction Set
 Application Acknowledgment Transaction Set(s)
 Functional Group Security Trailer
 Functional Group Trailer

Each *Application Acknowledgment transaction set* is provided for conveying verification that responsibility for the received FII is accepted (or not) by the receiving FII-system-user. Its structure is as follows:

Application Acknowledgment Transaction Set:
 Transaction Set Header
 Transaction Security Header
 Signature Data Segment
 Signature Binary Segment
 General FII Extensions Data Segment
 Acknowledgment Data Segment(s)
 Transaction Set Security Trailer
 Transaction Set Trailer

6.2.1.5. Query requests functional group

A *Query Requests* functional group is provided for conveying requests for imaged items, corresponding item information, and optionally, privately agreed user data as illustrated in figure 12.

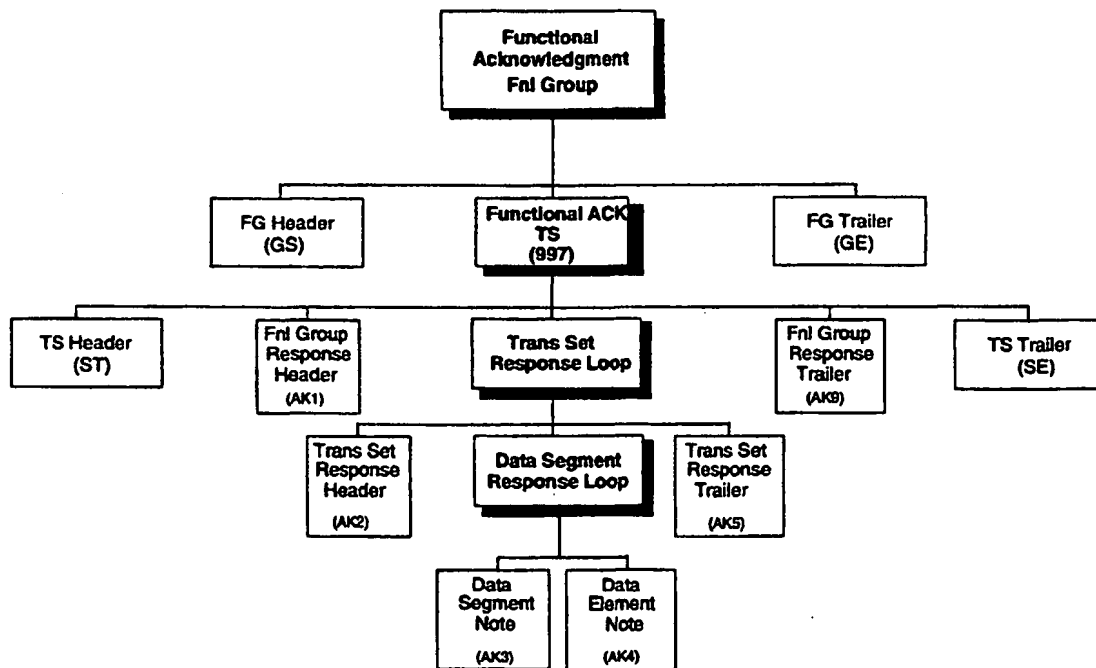


Figure 10 - Functional acknowledgment functional group model

It contains one or more *Functional Acknowledgment transaction set(s)* as follows:

Functional Acknowledgment Functional Group:
 Functional Group Header
 Functional Acknowledgment Transaction Set(s)
 Functional Group Trailer

Each *Functional Acknowledgment transaction set* (a.k.a. the X12 997 transaction set) is provided for conveying verification that the received FII is syntactically correct. It shall contain one *Transaction Set Header* and one *Transaction Set Trailer*, and one or more *Functional Acknowledgment data segment(s)*:

Functional Acknowledgment Transaction Set
 Transaction Set Header
 Functional Acknowledgment Data Segment(s), i.e., X12 segment identifiers AK1-AK9
 Transaction Set Trailer

6.2.1.4. Application acknowledgment functional group

An *Application Acknowledgment functional group* is provided for conveying verification that the received FII is accepted by the receiving FII-system-user. It is illustrated in figure 11.

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For each group of related bundles of imaged items, each instance of *Item Subgroup* shall contain one *Item Subgroup* data segment and one or more sets of *item data*:

Item Subgroup Segment:
 Loop Header (top level)
 Item Subgroup Information Segment
 Item(s) Data Structure
 Loop Trailer (top level)

For each imaged item in a bundle of related imaged items, each instance of *item data* shall contain one *Item Information* segment and one or more *item views*:

Item Data Loop:
 Loop Header (middle level)
 Item Information Segment
 Signature Data Segment
 Signature Binary Segment
 User Data Segment
 Item View(s) Structure
 Loop Trailer (middle level)

For each view of an imaged item, each instance of *item view* shall contain one *item view data segment* and one *view binary data*:

Item View Loop:
 Loop Header (bottom level)
 Item View Segment
 View Binary Data Segment
 Loop Trailer (bottom level)

6.2.1.3. Functional acknowledgment functional group

A *Functional Acknowledgment functional group* is provided for conveying verification that the received FII is syntactically correct, as illustrated in figure 10.

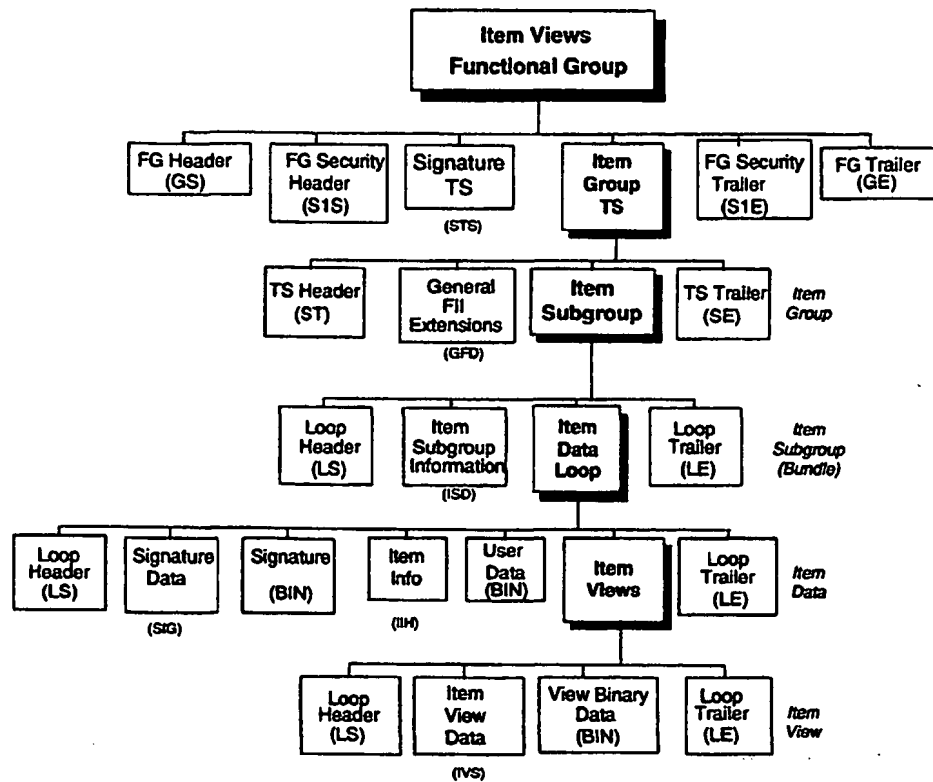


Figure 9 - Item views functional group model

An *Item Views functional group* is defined to convey information about items, user-defined data, views of imaged items, contained in one, or more, *Item Group transaction set*, and optional security-related features as illustrated in figure 9 as follows:

Item Views Functional Group:
 Functional Group Header
 Functional Group Security Header
 Signature Transaction Set
 Item Group Transaction Set(s)
 Functional Group Security Trailer
 Functional Group Trailer

An *Item Group transaction set* shall contain one *general FII extension* data segment, and one or more *item subgroup* structures which contains image items that are organized into groups of related (conceptual) *bundles* of imaged items:

Item Group Transaction Set:
 Transaction Set Header
 General FII Extensions Data Segment
 Item Subgroup Segment(s)
 Transaction Set Trailer

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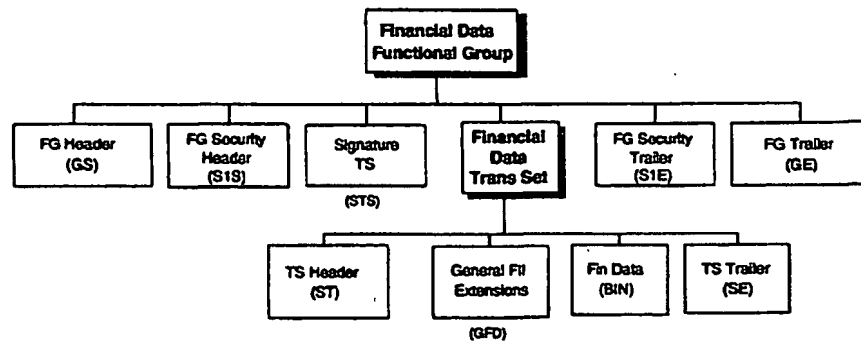


Figure 8 - Financial data functional group model

As illustrated in figure 8, the Financial Data functional group is composed as follows:

Financial Data Functional Group:
 Functional Group Header
 Functional Group Security Header
 Signature Transaction Set
 Financial Data Transaction Set(s)
 Functional Group Security Trailer
 Functional Group Trailer

Each *Financial Data* transaction set contains one General FII Extension segment and one Financial Data segment:

Financial Data Transaction Set:
 Transaction Set Header
 General FII Extensions
 Financial Data (Binary) Segment
 Transaction Set Trailer

6.2.1.2. Item views functional group

The *Item Views functional group* has more hierarchical layers than the other functional groups. It comprises transaction sets (where each contains groups of related imaged items), subgroups, item data, and item views as illustrated in figure 9. This design mimics the cash letter structure as currently used in the banking community. As such, the functional group structure can be viewed as corresponding to cash letters, bundles of items, detail items, and multiple views of each imaged item.

a *transaction set* reveals that it is composed of lesser objects called Segments. This standard uses several kinds of segments: Loop Header and Trailer segments, Data segments, and Binary segments. The concept of the existence of this lesser object is defined in X12.5. The functional groups comprise the main information objects exchanged in the FII protocol. Multiple functional groups of different types may be present in the same interchange, but they shall appear in the order specified in 6.2.2.

A functional group is the collection of related information objects exchanged between financial institutions. The collection of FII functional groups, and related transaction sets, can be graphically illustrated as in figure 7.

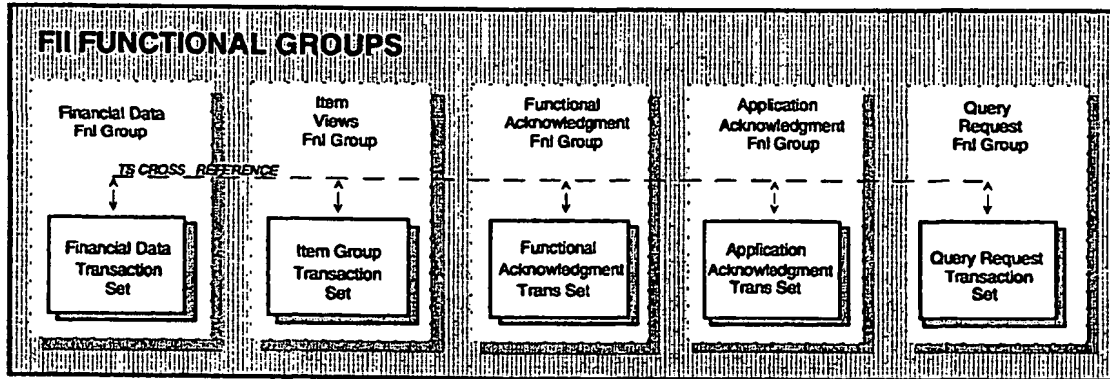


Figure 7 - FII functional group structure

The financial data regarding this transaction, and the supporting digitized image information, are conveyed as a set of sub-objects. The digitized image-related information is carried in a detail segment, deeply nested in a series of loops inside the Item Group transaction set. The loops mimic the financial industry's cash letter data structure used in cash letter processing. This design also provides a mechanism for cross-referencing between transaction sets and detail segments, and between transaction sets in the same interchange, or across interchanges. Additionally, security mechanisms are provided at all levels within a functional group for the purposes of data integrity, confidentiality, non-repudiation, and authentication. Further explanation and illustration, are provided in 6.2.1.1 through 6.2.1.4 and annex F of this Standard.

6.2.1.1. Financial data functional group

A *Financial Data functional group* is intended for conveying MICR line information and associated check processing data. As indicated elsewhere in this standard, the syntax of the processing data is outside of the scope of this standard. However, to facilitate the exchange of this type of data, this functional group contains a *Financial Data transaction set* and optional security related features, as illustrated in figure 8. In this and the next figures, a label in a box names an X12 defined label, and a label outside of a box names an X9.46 defined label.

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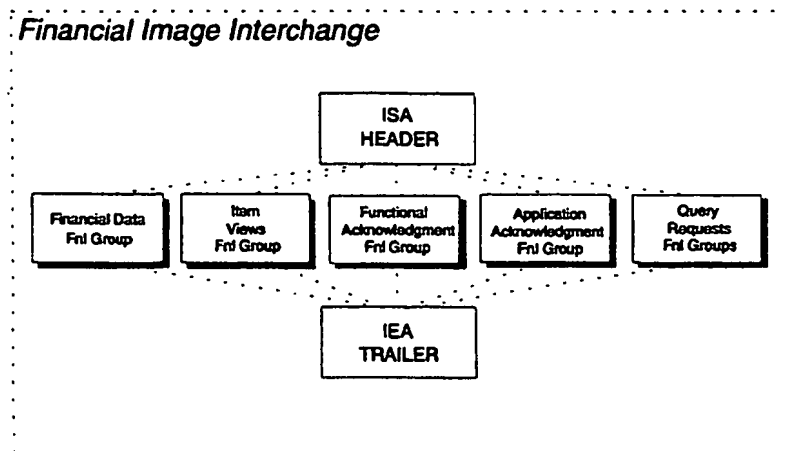


Figure 6 - FII structure

The FII structure consists of an ISA Header and an IEA trailer which surround one, or more, functional groups of digitized information. As defined in X12, an interchange is formed by sequencing components into a stream of bytes for exchange between applications. It can be illustrated as follows:

Interchange header (ISA)

Functional group 1
Functional group 2

•
 •
 •

Functional group n

Interchange trailer (IEA)

The functional groups comprise the primary information objects exchanged through the FII protocol. Multiple functional groups of different types may be present in the interchange. Annex A and 6.2.2 specifies their order of appearance in an interchange when multiple types of functional groups are present in a single interchange. The five types of functional groups specified in this Standard are as follows:

- *Financial Data functional group (<financial_data_fg>);*
- *Item Views functional group (<item_views_fg>);*
- *Functional Acknowledgment functional group (<functional_ack_fg>);*
- *Application Acknowledgment functional group (<appl_ack_fg>);*
- *Query Requests functional group (<query_requests_fg>).*

The FII structure (<fii_structure>) utilizes the X12 EDI model and protocol, i.e., the model specified in X12.5. However, this standard extends the X12 model to define synchronously interactive query services and protocols, and to specify an FII-system-user acknowledgment (at the application level) that may convey the user's acceptance (or rejection) of an interchange, and partial results to query requests. This standard also defines a data segment that extends the X12 transaction set header, and provides a mechanism for including digital signatures in the interchange.

6.2.1. Functional group overview

Functional decomposition of a *functional group* reveals that it is composed of lesser objects called a *functional group header*, *transaction sets (TS)*, and a *functional group trailer*. Functional decomposition of

- a. There shall be at least one element in a segment (in addition to the segment identifier). Data elements composed of subelements whose values are defined to be Optional still must contain the subelement separator, if any subelement value is present.
- b. If elements are defined as optional or defaulted, it is necessary to retain the `<gs>` or `<us>` delimiter as required to avoid ambiguity. For example, if a segment would normally appear as

`"SEG <gs>a<gs>b<gs>c<gs>d<gs>e<tr>"`

and the values *b*, *c*, and *e* are the default values for those positions, then the segment could also be comprised as

`"SEG <gs>a<gs><gs><gs>d<gs><tr>"`

or as

`"SEG <gs>a<gs><gs><gs>d<tr>"`

(note that the last `<gs>`, that is immediately followed by a `<tr>`, is optional since it is not required to prevent ambiguity).

Similarly, an element encoded as

`"v<us>w<us>x<us>y<us>z"`

with *w*, *x*, and *z* defaultable, can be comprised as

`"v<us><us><us>y<us>"`

or as

`"v<us><us><us>y"`

6.1.8 Bit organization for any pixel byte

For bit organization and bit padding, see annex B.

6.2 FII structure and specification of data elements

From a modeling perspective, the FII can be viewed as comprising numerous information objects. The primary object is the interchange itself. Functional decomposition reveals that it comprises lesser objects: a single ISA header; one, or more, functional groups; and a single IEA trailer. This standard specifies four (4) functional groups, and imports one acknowledgment functional group directly from X12.22 (i.e., a "Functional Acknowledgment"). When present in the interchange, functional groups shall appear in a specific order, as illustrated, left to right, in figure 6.

In the following figures, shadowed boxes indicate that the object may occur multiple times

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6.1.5 Segments, elements, subelements, and delimiters

Structures in X12 are composed of building blocks called **segments**. There are two types of segments: **control segments** and **data segments**. Control segments are used to define headers and trailers for such structures as interchanges, functional groups, transaction sets, and loops. Data segments are used to define objects such as cash letters, checks, and images which are recognizable in a business context.

Segments are composed of **elements**, which are sometimes, in turn, composed of **subelements**. A segment may be defined as a sequence of elements separated by **data element separator** characters and terminated with a **terminator** character. An element may be defined as either a single **data instance** of a type specified in section 6.1.4, or as a sequence of such data instances which are separated by **subelement separator** characters.

The separators and terminator characters are defined in table 9. Note that this standard, unlike the X12 standard, requires that the delimiters take only the value listed in table 9. Because delimiters are used to aid in disassembling the interchange, the listed values shall not be used within any data type, except within a BIN segment which is ignored when parsing the interchange structure.

Table 9 - Separators and terminator characters

Separator names: Delimiters used in this standard	Code	Notation	ASCII / EBCDIC Decimal	ASCII / EBCDIC HEX
Data element separator	<gs>	GS ¹	29	1D
Sub-element separator	<us>	US ²	31	1F
Terminator (ends a FG/TS/DS)	<tr>	FS ³	28	1C

1 GS means group separator as defined in 3.1 of X12.5

2 US means unit separator as defined in 3.1 of X12.5

3 FS means file separator as defined in 3.1 of X12.5

Within a segment, the semantics of a data instance is dependent on its position. The first data instance is always a two or three character segment identifier. This identifier names the segment which, in turn, identifies the syntax and semantics of its remaining data instances. As an example, the identifier, "ISA", represents an interchange header; its syntax and semantics are described in section 6.2.3. The length of a segment is the number of bytes from the beginning of the first element (i.e., including the segment identifier) through (and including) the terminator character.

Within an element, the meaning of a data instance depends on its position. However, rather than including an element identifier, the syntax and semantics are defined by the position of the element within the segment. The length of an element is the number of bytes from the beginning of the first subelement through the end of the last subelement. Subelement separator are included in the length calculations.

6.1.6 X9.46 delimiters

The embedded "." character delimits variable length component values within a data element.

6.1.7 Intra-segment syntax Intra-segment syntax for the segments defined in section 6.15 is governed by the following::

6.1.4.5 Decimal Number

A decimal number type identifies a numeric data element which contains an explicit decimal point and is used for numeric values that have a varying number of decimal positions. The representation for this data element type is R. The decimal point always appears in the character stream, if the decimal point is at any place other than the right end. If the value is an integer (decimal point at the right end), the decimal point should be omitted. For negative values, the leading minus sign (-) is used. Absence of the sign indicates a positive value. The plus sign (+) should not be transmitted. Leading zeros should be suppressed unless necessary to satisfy a minimum length requirement. Trailing zeros after the decimal point should be suppressed, unless necessary to indicate precision. The use of a triad separator (for example, the commas in 1,000,000) is expressly prohibited. The length of a decimal type does not include the optional leading sign.

This standard's specific additional requirements for a decimal number syntax are as follows:

- *If the value is an integer (decimal point at the right end), the decimal point shall be omitted.*
- *Leading zeros shall be suppressed unless, necessary to satisfy a minimum length requirement.*
- *There must always be at least one digit before an embedded decimal point.*
- *Trailing zeros after the decimal point shall be suppressed, unless necessary to indicate precision.*
- *The representation for this data element type is <decimal> in annex A.*
- *The length of the decimal number does not include the optional sign or decimal point, for example the value 2.3 or .23 has a length of 2, and that 2.33, .233 or 23.3 has a length of 3.*

6.1.4.6 Binary

The binary data element is a syntax which is composed of any sequence of bytes (8 bit encoding), each ranging in value from binary 00000000 to binary 11111111. This data element has no defined maximum length. Actual length of any binary encoded object is specified in bytes by the immediately preceding data element. The representation for this data element type is B, and <binary> in annex A. X12 uses the term *binary data* because a translator conforming to the standard has no specific understanding of this sequence of bytes. Normally, a receiving FII-translator will make its value available to the receiving FII-system-user, without regard to its integrity or correctness. This is a consequence of the value's (i.e., the encoded object) syntax and semantics being outside the scope of this standard.

6.1.4.7 Identifier

An identifier data element always contains a value from a pre-defined list of values that is maintained by the X12 Committee, or some other body recognized by the X12 Committee. Trailing spaces should be suppressed unless necessary to satisfy minimum length. The representation for this data element is ID.

This standard's specific additional requirements for an identifier syntax are as follows:

- *This data element is composed of a sequence of characters from: the set of upper case letters A to Z, digits from 0 to 9, and the space character.*
- *The representation for this data element is <id> in annex A.*

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This standard's specific additional requirements for a time syntax are as follows:

- *The value for time shall be expressed in terms of the originator's local time zone.*
- *The character repertoire is composed of the digits 0 through 9.*
- *Data values shall be populated left to right.*
- *Representation for this data element type is <time> in annex A.*

If the size of a data element (whose data type is TM) is constrained to a length of 4, then the value is in hours and minutes (HHMM). If it is constrained to a length of 6, then the value is in hours, minutes, and seconds (HHMMSS), and so on.

A decimal point separating SS and *d.d* is implied, i.e., an embedded decimal point is not used in this syntax.

6.1.4.3. String

A string syntax identifies a value which is composed of a sequence of any characters from the basic or extended character sets. Space filled data elements apply to fixed length data values. The significant characters shall be left justified, and shall be space filled. Leading spaces, when they occur, are presumed to be significant characters. Trailing spaces should be suppressed unless they are necessary to satisfy a minimum length. The representation for this data element type is AN.

This standard's specific additional requirements for a string syntax are as follows:

- *These characters are also classified as "printable" or alpha-numeric.*
- *The representation for this type is <string> in annex A.*

6.1.4.4 Numeric

A numeric is represented by one or more positive digits with an optional leading sign representing the value in the normal base of 10. The value of a numeric data element includes an implied decimal point. Elements representing dollar amounts have an implied decimal of 2, i.e., they convey values in cents. It is used when the position of the decimal point within the data is permanently fixed, and is not transmitted with the data. The data element dictionary defines the number of implied decimal positions. The representation for this data element type is Nn, where "N" indicates that it is numeric and "n" indicates the number of decimal positions to the right of the implied decimal point. If "n" is 0, it need not appear in the specification; "N" is equivalent to "N0". For negative values, the leading minus sign (-) is used. Absence of the sign indicates a positive value. The plus sign (+) should not be transmitted. Leading zeros should be suppressed unless necessary to satisfy a minimum length requirement. The length of a numeric type data element does not include the optional sign.

This standard's specific additional requirements for a numeric syntax are as follows:

- *It is composed of one or more positive digits from the set 0 through 9 and whose encoding is specified in 6.1.3.*
- *All values shall be positive (i.e., a minus symbol is not used).*
- *The representation for this type is <numeric> in annex A.*

b. *Other special characters***Table 7 - Other special characters**

Description	Character	ASCII decimal	ASCII hex	EBCDIC decimal	EBCDIC hex
percent sign	%	37	25	108	6C
less than sign	<	60	3C	76	4C
greater than sign	>	62	3E	110	6E
commercial at	@	64	40	124	78
opening bracket	[	91	5B	—	—
reverse solidus	\	92	5C	224	E0
closing bracket	]	93	5D	—	—
underscore	_	95	5F	108	6D
opening curly brace	{	123	7B	123	7B
pipe (vertical bar)	|	124	7C	173	AD
closing curly brace	}	125	7D	208	D0
tilde	~	126	7E	161	A1

c. *National characters***Table 8 - National characters**

Description	Character	ASCII decimal	ASCII hex	EBCDIC decimal	EBCDIC hex
number sign	#	35	23	123	7B
dollar sign	\$	36	24	91	5F

6.1.4 Data type representations

The following data types are used throughout this standard to identify the character repertoire, or encoding, used in a data element (i.e., element) or subelement:

6.1.4.1 Date

The **date** identifies the syntax expressing the ISO standard date in *YYMMDD* format in which *YY* is the year within the century (00 to 99), *MM* is the month (01 to 12), and *DD* is the day (01 to 31). Representation for this data element type is **DT**.

This standard's specific additional requirements for a date syntax are as follows:

- *The character repertoire is composed of the digits 0 through 9.*
- *Representation for this data element type is <date> in annex A.*
- *The value for date shall be expressed in terms of the originator's local date.*

6.1.4.2 Time

The **time** syntax identifies a value expressing the ISO standard time in *HHMMSSd..d* format in which *HH* is the hour for a 24 hour clock (00 to 23), *MM* is the minute (00 to 59), *SS* is the second (00 to 59), and *d..d* is the decimal second. Representation for this data element type is **TM** in the tables and <time> in annex A.

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c. *Special characters***Table 5 - Special characters**

Description	Character	ASCII decimal	ASCII hex	EBCDIC decimal	EBCDIC hex
exclamation point	!	33	21	90	5A
quotation mark	"	34	22	127	7F
ampersand	&	38	26	80	50
apostrophe	'	39	27	125	7D
opening parenthesis	(	40	28	77	4D
closing parenthesis	)	41	29	93	5D
asterisk	*	42	2A	92	5C
plus sign	+	43	2B	78	4E
comma	,	44	2C	107	6B
hyphen (minus sign)	-	45	2D	96	60
period	.	46	2E	75	4B
solidus	/	47	2F	97	61
colon	:	58	3A	122	7A
semicolon	;	59	3B	94	5E
equals sign	=	61	3D	126	7E
question mark	?	63	3F	111	6F

d. *Other characters***Table 6 - Other characters**

Description	Character	ASCII decimal	ASCII hex	EBCDIC decimal	EBCDIC hex
space character	␣ ¹	32	20	64	40

¹ - The symbol "␣" is used only for editorial purposes to represent a *space character* whose encoding is as indicated in the table.

6.1.3.2. Extended character set

The extended character set may be used, if not prohibited in the Banking Practices Agreement. It includes the lowercase letters and other special characters specified below:

a. *Lowercase letters from a to z*

(ASCII: 97 to 122 decimal; 61 to 7A hex, respectively)

(EBCDIC: 129 to 136, 145 to 153, 162 to 169 decimal; 81 to 89, 91 to 99, A1 to A9 hex, respectively)

- B₃₂ shall be present when a snippet is requested.
- B₃₃ shall be present to obsolete an outstanding query request.
- B₃₄ shall be present to override the 300 second default.
- B₃₅ shall be present only to request a generic search on a specific value or range of values.

6.1.3 Character set

All data element and subelement values, except those of a binary data element, shall be created using characters and symbols specified in 6.1.3.1 or 6.1.3.2. These are subsets of ASCII and EBCDIC character sets. Unless otherwise stated in the Banking Practices Agreement, all characters and symbols shall have representation in the common character 8-bit ASCII code scheme, which is based on CCITT V.3 International Alphabet 5. Optionally, characters may also be encoded in 8-bit EBCDIC rules, if permitted in the Banking Practices Agreement. ASCII and EBCDIC characters shall not be intermixed in the same interchange. ASCII encoded characters are always encoded beginning with the most significant (left-most) bit, and ending with the least significant (right-most) bit.

6.1.3.1 Basic character set

The basic character set shall be composed of the following characters:

- a. *Uppercase letters from A to Z*
(ASCII: 65 to 90 decimal; 41 to 5A hex, respectively)
(EBCDIC: 193 to 201, 208 to 217, and 226 to 233 decimal; C1 to C9, D1 to D9, and E2 to E9 hex, respectively)
- b. *Digits from 0 to 9*
(ASCII: 48 to 57 decimal; 30 to 39 hex, respectively)
(EBCDIC: 240 to 249 decimal; F0 to F9 hex, respectively)

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- B₁₁ shall be present if the data element is required.
- B₁₂ shall be present if an acknowledgement is requested, and the defaults are inappropriate.
- B₁₃ shall be present when responding to query request, may be present for other transaction sets.
- B₁₄ shall be present for transaction sets containing item group, financial data, or query requests.
- B₁₅ shall be present only to redirect an acknowledgement to a recipient other than the sender of this functional group.
- B₁₆ shall be present when responding to a Query Request.
- B₁₇ shall be present only to specify a limit for a generic criterion.
- B₁₈ shall be present when <general_fii_extensions> are conveyed in the Financial Data Functional Group.
- B₁₉ shall be present when <general_fii_extensions> are conveyed in the Item Group Transaction Set.
- B₂₀ shall be present only in an Item Group Transaction Set.
- B₂₁ shall be present in Item Views Functional Group unless explicitly omitted in Banking Practices Agreement.
- B₂₂ shall be present to cross reference to financial data, or query requests, if appropriate.
- B₂₃ shall be present when cross referencing to another X9.46 transaction set, unless explicitly omitted by the Banking Practices Agreement.
- B₂₄ shall be present only to supplement the routing number of the financial institution by, or through whom, the item is payable.
- B₂₅ shall be present if necessary to identify properly the snippet.
- B₂₆ shall be present when <clipping_info> are conveyed.
- B₂₇ shall be present only if <application_ack_diagnostic_code> indicates that constraints have been exceeded unless explicitly omitted in the Banking Practices Agreement.
- B₂₈ shall be present if the <query_request_type> is other than a cancel request ("0").
- B₂₉ shall be present if the <query_request_type> is cancel request ("0") or restart request ("3").
- B₃₀ shall be present only if specified in BPA, and then shall be subject to the type of acknowledgment requested..
- B₃₁ shall be present if the <query_request_type> is retrieve request ("1").

- C₁₉ valid only if both snippet origin and offset are used.
- C₂₀ valid only if snippet origin is used.
- C₂₁ valid for any transaction set, shall be present when responding to a query request.
- C₂₂ valid only when the acknowledgement is in response to a query request other than Query Cancel Request ("0").

Only elements designated OPTIONAL may identify a DEFAULT value. A DEFAULT shall indicate that, if the value for the element is absent in an FII, a receiving FII-translator shall understand it to convey the semantics of the value designated as DEFAULT in this standard. Receiving FII-translators, or FII-system-users, shall not consider the absence of any Optional, or DEFAULTed, element of protocol to be a protocol violation. If two structures or elements may be either both be present or not present, the first element (such as header) is designated as OPTIONAL and the second, such as a trailer, is designated CONDITIONAL.

The fact that a minimum length is specified for values, does not prevent Optional (or DEFAULTed) values from being entirely absent from an interchange with an actual length of zero. This descriptive convention is used to be consistent with X12 standards.

f. Business usage

This column contains values indicating the support required of business user applications by this standard. Its value expands upon the protocol support as required by the business community. The values shall be one of the following:

M *Mandatory: The value(s) for this data structure, data element value, or subelement value shall be present upon origination of the interchange, and shall be handled and made available to the receiving FII-system-user on reception. Business usage is always mandatory when protocol support is mandatory.*

B_x *Business Conditional: A value for this data element or subelement is present, or absent, under certain conditions, or as defined in the Banking Practices Agreement. Specific predicates are indicated with numbers (i.e. B_x) defined in the inline text. Use of a Default value satisfies a Business Conditional usage requirement.*

- B₁ shall be present only if specified in Banking Practices Agreement.
- B₂ shall be present unless explicitly omitted in the Banking Practices Agreement.
- B₃ shall be present only to override or supplement Banking Practices Agreement.
- B₄ shall be present if financial data is in the interchange.
- B₅ shall be present if views of imaged items are in the interchange.
- B₆ shall be present if a Functional Acknowledgement is conveyed in the interchange.
- B₇ shall be present if an application acknowledgement is conveyed in the interchange.
- B₈ shall be present if a Query Requests Functional Group is present in the interchange.
- B₉ shall be present only to specify or to convey security features or security mechanisms.
- B₁₀ shall be present if the <query_request_type> is restart request ("3").

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If not present, no error will be generated because of the absence of an optional data structure (functional group, transaction set, data segment), data element, or subelement.

Cx Conditional: The FI-translator's origination Support for this data structure, data element, or subelement is mandatory under certain conditions, and optional under all other conditions.

The predicates "x" are indicated with numbers (i.e. Cx) defined as follows:

- C₁ shall be supported if security at the present structural level is supported.
- C₂ Conditional, valid only when the value of <trans_set_id> in the Transaction Set header is Item Group, Financial Data, or Query Request
- C₃ required when cross referencing between transaction sets.
- C₄ each shall be supported, but only one shall be present in acknowledgement.
- C₅ if Query Requests Functional Group is supported, it too shall be supported. However, it shall only be present in a cancel request ("0"), and no other data elements shall be included in the segment.
- C₆ shall be present only if signature data <signature_data> is present.
- C₇ present only if requested to be acknowledged at the this level. If used, either the <subject_ts_ref_id>, <subject_isd_ref_id>, <subject_item_ref_id>, <subject_item_view_id>, or <subject_qrd_id>, shall be present. The presence of more than one of these shall be considered a protocol violation.

The term valid is used in the predicates C₈ - C₂₃ to indicate that the applicability of a specific data element depends on the type of structure and function. It does not dictate the presence of the value in the interchange, and the data element is considered to be optional.

- C₈ valid only if the <query_request_type> is other than a cancel request ("0")
- C₉ valid only in a Financial Data Functional Group
- C₁₀ valid only in a Item Group Transaction Set
- C₁₁ valid only if required by or applicable to the security mechanism utilized.
- C₁₂ valid only if the <query_request_type> is cancel request ("0") or restart request ("3").
- C₁₃ valid only if the <query_request_type> is search request ("2").
- C₁₄ valid only if the <query_request_type> is retrieve request ("1").
- C₁₅ valid only when <view_side_requested> is frontal view ("0") or rear view ("1").
- C₁₆ valid only if the <query_request_type> is restart request ("3").
- C₁₇ valid only if <application_ack_diagnostic_code> indicates that constraints have been exceeded ("8").
- C₁₈ valid only if snippets are used.

c. Data type

This column shall contain values which represent the kind of data required for the entry. The values shall be date (DT), time (TM), string (AN), numeric (NN), decimal number (R), binary (B), or identifier (ID). The meaning of these values is described in 6.1.4 through 6.1.9.

The ID type requires that the values be registered in X12.22.

d. Reference

This column contains the appropriate reference for any data element specified in X12.5, X12.6, X12.22, and X12.58 version 003050 and structures defined in this standard. The reference is to the X12 data dictionary number, or label. For example, if the table defines the X12 ISA header, this reference is to the X12.5 data element definitions. A structure enclosed in brackets ([]) is defined by X9.46.

e. Protocol support

This column contains values indicating the support required by this standard, and X12, for these entries. Support shall be verified as part of an implementation's conformance evaluation. The values shall be one of the following:

M Mandatory:

On origination of the interchange, this data structure (functional group, transaction set, data segment), data element's value, or subelement's value, shall be present, and shall comply with its defined syntax, i.e., size and data type as specified. An error shall be generated if this data structure (functional group, transaction set, data segment), data element, or subelement, is absent.

On reception of the interchange, this data structure (functional group, transaction set, data segment), data element, or subelement, shall be handled and made available to the receiving FII-system-user. An error shall be generated if this data structure (functional group, transaction set, data segment), data element, or subelement, is absent.

- "Handle" means that the FII-translator will recognize it, correctly parse its syntax, and validate only its size and data type.

- "Make Available" means that the FII-translator will pass the data contents to the FII-system-user.

An optional data-element may contain optional or mandatory subelements. If a subelement is mandatory it shall be present when the parent data element is present.

O Optional:

On origination, this data structure (functional group, transaction set, data segment), data element, or subelement may be supported by the translator. When supported, it shall have a size and data type as specified

On reception, FII-translator shall support this data structure (functional group, transaction set, data segment), data element, or subelement as follows:

If present, this data structure (functional group, transaction set, data segment), data element, or subelement shall be handled by the receiving FII-translator and shall be made available to the receiving FII-system-user.

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6.1.2 Element table conventions

The element tables used throughout this standard summarize the structures, data elements, and data subelements. Each table uses the following layout and conventions:

Table 4 - Element table conventions

Data Element Names	Size	Data type	Ref. ²	Protocol support	Business usage
<structure_name>					
<element_name> ¹					
<subordinate_element_name>					
<subelement_name>					

1 - The <element_name> may also be a structure name

2 - X9.46 referenced components are shown in brackets([]), while X12 referenced components lack brackets.

All loops in this standard should not exceed 999999 iterations, unless otherwise specified in this standard.

A dash (-) in any column of the table indicates that column is not applicable for that specific data element. The column titles indicate the following information:

a. Data element names

This column contains the structure, data element, and data subelement names that are to be used for each entry. The names are surrounded by <> to match the BNF coding notation used in annex A. Successively lower levels are indented. A <subordinate_element_name> in *italics* is present to identify a parent data element which is included for information only. It has no identity in the protocol, except through its associated subelements, i.e., <subelement_name>.

b. Size

This column shall define the minimum and maximum number of characters of the value for a data element when present. The format is XX/YY where XX is minimum size, and YY is maximum size. Values outside of the range shall be considered protocol violation. If the data element is composed of subelements, the size includes the sub-element separator characters. The data element delimiter (<gs>) and structure delimiter (<tr>) are not included in the size value.

The size for subelement values does not include the subelement separator. However, subelement delimiters are included in the size of the parent data element because subelement separator(s) shall be present in a data element even though the value for the subelement may be absent. For example, when the data element consists of 3 sub-elements, the size value for XX and YY will be determined as the value, plus 2 characters for the 2 sub-element delimiters.

The size of a structure is the sum of the following components:

- 1 character for each data element delimiter, plus,
- 1 character for the structure terminator (<tr>), plus,
- 2 or 3 characters for the length of the structure identifier (e.g., "GS" = 2 characters), plus,
- Sum of the sizes of the values for the actual data elements.

6.1.1 Interchange structure template

Each clause that defines a functional group, transaction set, or data segment will be specified using the following template:

- Name;
- Description including:
 - *Purpose*;
 - *Number of occurrences*;
 - *Position in the interchange hierarchy*.
- Protocol support;
- Business usage;
- Table of elements in structure.

Each data element and sub-element will be defined with the following (see 3.2, 6.1.1.1., and 6.1.2 for more explanation):

- Name;
- Description including:
 - *Source*;
 - *Examples*.
- Size;
- Data type (alpha-numeric, numeric, decimal, etc.);
- BNF notation
- Values;
- Protocol support;
- Business usage.

6.1.1.1 Values

Values for X9 defined data elements and X12 specified data elements shall be only those defined in this version of the standard. Values which are *reserved* in this standard for *private use* may be used per the Banking Practices Agreement. Any value that is not *reserved* or defined in this standard shall not be used, as its presence may cause rejection of the interchange by a receiving application, or may be used in future versions of this standard. Future versions of this standard may assign a different meaning to that value.

Some element values have been defined as the concatenation of values from other data elements without the use of the subelement separator. When concatenated without the subelement separator, the value of the element is populated left to right, as specified in the description for the (concatenated) element.

The term *DEFAULT* has been applied to certain data element values throughout this specification. When used in the data element's definition, the value, identified with the key word *DEFAULT*, shall be understood and used, by the receiving FII-translator when an actual value for that data element is absent from the interchange. If an actual value is present in the interchange for a *DEFAULTed* data element, the value that is present takes precedence over the *DEFAULT*. *DEFAULTs* provide a mechanism for reducing the size of an interchange.

NOTE – The fact that a minimum length is specified for values does not prevent Optional (or *DEFAULTed*) values from being entirely absent from an interchange with an actual length of zero. This descriptive convention is used to be consistent with X12 standards.

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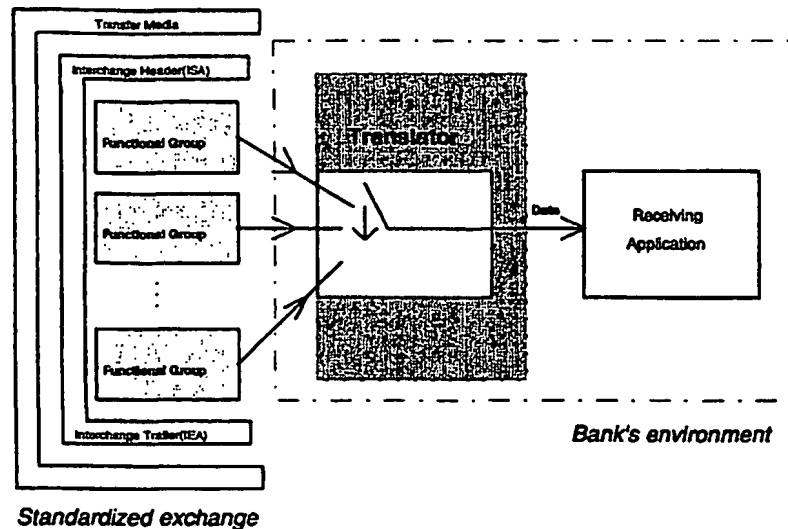


Figure 5 - Function of an FII Translator of the receiving application

5.1.5 Transfer Mechanism

A Transfer Mechanism specifies how packaged interchange content is delivered from the originating imaging application's FII-translator to the receiving imaging application's FII-translator. Examples of such a method are:

- Through physical delivery of a computer medium which contains the packaged interchange data.
- Through a computer network by transmitting the packaged interchange data electronically.

The specifics of the Transfer Mechanism are outside of this Financial Image Interchange Standard, but are within the purview of a Banking Practices Agreement.

6 FII technical specification

This clause specifies the Financial Image Interchange (FII), including data structures and protocol that are used for the conveyance of the data in accordance with the FII Model illustrated in annex F. The FII Model, illustrated in figure F.3 employs a hierarchical order when specifying the names, contents and definitions of the X12 ISA header, X12 IEA trailer, functional groups, transaction header sets, and data segments.

This standard is wholly based on the principles and transaction interchange formats as defined in the X12 EDI specification. However, it goes well beyond the current capabilities of the X12 EDI model by introducing query and acknowledgment translator services for FII-system-users.

6.1 Conventions, character sets, and data types

The following clauses specify the notation conventions, character sets, and data types used throughout this specification.

sequential series of steps, diagrammed as a switch, which emits and accepts standardized interchange. The standardized interchange is the standard structure that is exchanged across system boundaries.

In the examples of the originating and receiving applications in figures 4 and 5, the Functional Groups are all of one type, and could be any one of the data groups defined herein.

The FI-translator's functional model, i.e., the behavior of the translator, and the emitted (and accepted) protocol are covered in this Standard, and further elaborated in annex D of this standard. The translator is modeled as having 2 interfaces: one well specified interface which emits and receives FIs, and a "fuzzy" interface that passes data to and from the user application. Some times this standard places requirements on actions that occur across the fuzzy interface that may be implemented by either the user application, the translator, or by some private means. However, the internal design of a FI-translator is not part of this standard.

NOTE - A FI-translator may be implemented as part of imaging applications, to enable imaging applications to deposit the data groups into, or withdraw them from, the interchange data structure.

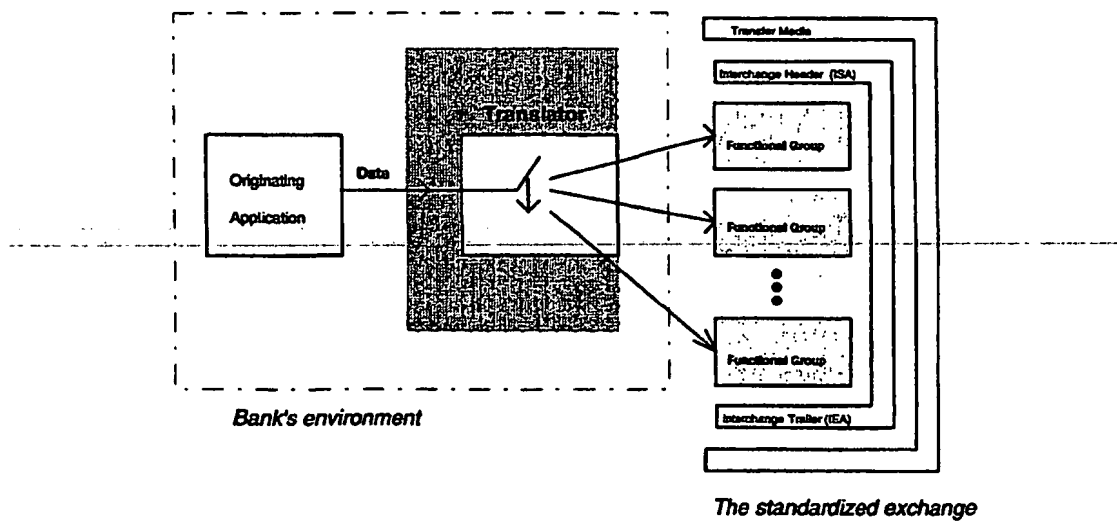


Figure 4 - Function of an FI Translator of the originating application

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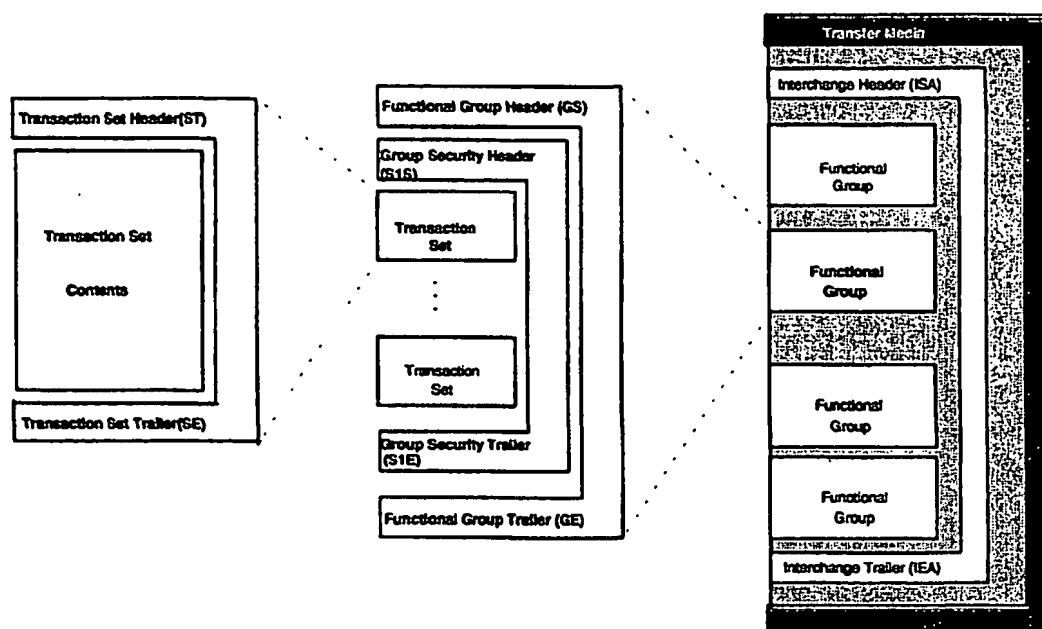


Figure 3 - Interchange data structure

The transaction set contents are different for each functional group.

For example, the structures contained in the FII's functional groups are as follows:

- For a *Financial Data* functional group, the transaction set contents contain financial data;
- For an *Item Views* functional group, the transaction set contents contain bundles of views of imaged items, item information for each view and item view data;
- For a *Query Requests* functional group, the transaction set contents contain query request data;
- For an *Application Acknowledgment* functional group, the transaction set contents contain acknowledgment data.
- For a *Functional Acknowledgment* functional group, the transaction set contents contain syntax analysis results data.

Security header, security trailer, and other security data are handled by mechanisms outside of, and beyond, this specification, but are accommodated by this standard.

5.1.4 Translator

The translator (FII-translator) function of the originating application produces an interchange object (i.e., a complex data structure) by translating the output of the local image handling, data processing, or data storage application into a standardized interchangeable "edi" structure. The peer translator function of the receiving application translates the "edi" interchange into the locally understood data structures for subsequent storage or processing of the data by the receiver's application. The functions of the FII-translator are shown in figures 4 and 5.

Figure 4 and 5 show examples of a translator processing multiple functional groups of imaged items on behalf of originating (Figure 4) and receiving (Figure 5) imaging applications. The translator follows a

The kinds of data supported in this standard are as follows:

- *Financial item processing data which relate to a physical financial item;*
- *Digitized representations of an item, and its corresponding image processing data;*
- *Query request data for requesting information about stored imaged items, or for requesting the images themselves;*
- *Receiver acknowledgment data to signal acceptance (or rejection) of an interchange, as well as a listing of the names of imaged items found that meet a set of query selection criteria.*

The functional groups which correspond to the four kinds of data mentioned above are the following:

- *Financial data*
- *Item Views*
- *Functional Acknowledgment*
- *Application Acknowledgment*
- *Query Requests*

More than one Functional Group may be included in an interchange. An interchange may contain a mix of functional group types.

In the current environment of paper check exchange, a cash letter analogy can be applied to the design of the Financial Data, and Item Views functional groups:

Table 3 - Paper exchange and its FII-structure counterpart

Paper exchange	FII structure counterpart
Electronic cash letters	Financial data segment
Groups of physical cash letters	Item views functional group
Physical cash letters	Item views functional group
Physical bill bundles	Item subgroup
Physical items	Item information and views

5.1.3 Data structure

Figure 3 shows the general organization of interchange data structures within an X12 EDI interchange. The contents between the header and the trailer consist of one, or more, groupings of data which are functionally related, called a functional group. A functional group contains a group header, a group trailer, and group contents. The group contents consists of sets of related transaction data, called transaction sets, and optionally, a group security header and trailer. Transaction sets consist of related data organized in the form of segments, called data segments. Data segments are made up of a segment identifier, data elements, and delimiters.

The term *structure* is used throughout this document for simplicity to identify Functional Groups, Transaction Sets, and Data Segments.

The details of a functional group's content can be found in clause 6.

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This standard describes the data (the letter contents) and the interchange, consisting of the envelope and its contents (data). In this standard, the Financial Image Interchange (FII) is the instance of an electronic data interchange (edi) defined in this standard.

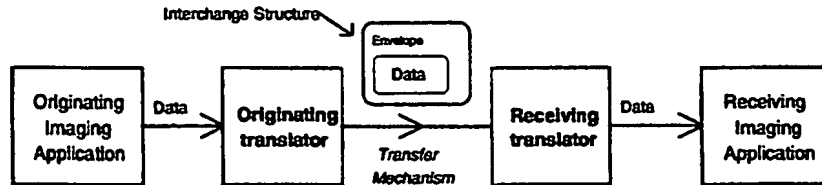


Figure 2 - An abstract representation of the FII system's model

An abstract representation of the financial image interchange system's model is shown in figure 2. This model represents the end-to-end interchange process, from the originating imaging application to the receiving imaging application. In the model, data to be interchanged may consist of any combination of the following: financial data, item groups (image view data), acknowledgments, or query requests. There may be many FII-translators that operate on the contents of an interchange as it moves to its final destination. The data to be interchanged from the originating imaging application are packaged by the FII-translator, and sent to the receiving imaging application. Upon receipt of the interchanged data, the FII-translator will unpackage (parse) the incoming data for the receiving imaging application. Then, the receiving imaging application may generate acknowledgments or replies to query requests, and become the originating imaging application for a new image interchange.

The image interchange system terms corresponding to those in figures 1 and 2 are listed as in table 2:

Table 2 - Relationship between FII terms

FII terms	Figure 1 terms	Figure 2 terms
FII-system-user (application)	The originating person	The originating imaging application
User data	Letter	Data
FII-translator (originator)	Deposit the letter into the envelope	Originating translator
FII structure	Addressed envelope with contents (data)	Interchange structure
Transfer mechanism	Post office mail delivery	Transfer mechanism
FII-translator (receiver)	Withdraw the letter from the envelope	Receiving translator
FII-system-user (application)	The receiving person reads the letter	The receiving imaging application uses the data

This analogy is used only as an aid in explaining the use of a standardized interchange, and is not intended to be an implementation directive.

5.1.2 Data

The originator of an interchange has the purpose of providing data, and the receiver of an interchange has the intent to do work from the data received in an interchange.

Using the analogy described in figure 1, the data to be interchanged corresponds to the contents of the envelope. Inside the envelope, there may be several letters and each letter may have several pages and paragraphs. Indeed, several letters may be sent. In the context of this standard, each letter can be viewed as a functional group, consisting of data, which is defined to perform a similar function.

5. Technical overview

5.1 Introduction

This overview provides a high level description of the financial image interchange process, the structure of the image and the image related data, and the use of data structure in the interchange process. This standard provides for end-to-end exchange, query, and acknowledgment of financial data and images. It does this by presenting a system model and a description of its protocol components: data, data structure, translator, and internal procedures.

This standard specifies the data groups and data structure for financial image interchange. In addition to interchanging images, this standard also supports interchanging financial data, acknowledgment, and query request services associated with images and financial data. It does this by defining expected procedures to be followed to complete an end-to-end exchange of information, so that translators achieve a common minimum level of service. The creation and use of the data by the originating and receiving imaging applications at the communicating financial institutions are outside the scope of this standard. The process of how to deposit the data into, and withdraw them from, the data structure and the method employed to deliver the data structure containing the deposited data (communication method) are outside the scope of this standard.

This standard also defines the conditions for which a financial image interchange translator is deemed compliant on origination and reception.

Clause 5 introduces the concepts for Financial Image Interchange. Clause 6 and Annex A provide the detail specification, and clause 7 provides the conformance requirements.

5.1.1 System model overview

An analogy of a person sending a letter to another person may be used to explain how an image interchange system works. Figure 1 shows two persons involved in the letter communication process. One is the originating person, and the other is the receiving person. The originating person writes a letter, puts it into an envelope, and drops the envelope into a post office mail box. The post office takes the envelope and delivers it to the receiving person. The receiving person opens the envelope, withdraws the letter from it, and reads the letter.

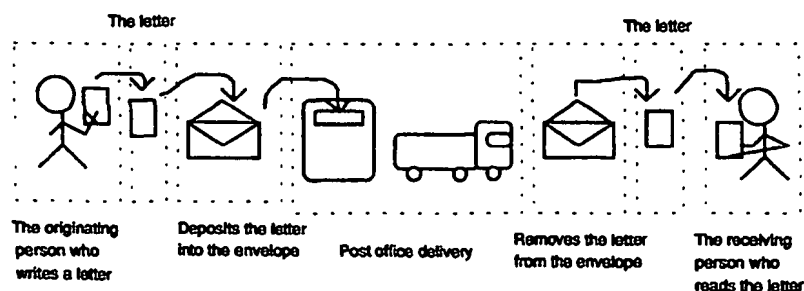


Figure 1 - An analogy of a person sending a letter to another person

An imaging interchange system is similar to the preceding analogy. As illustrated in figure 2, in an imaging interchange system, there is an originating imaging application and a receiving imaging application. The originating application produces data, deposits the data into a data structure, and sends it by some kind of transfer mechanism. The receiving imaging application withdraws the data structure to obtain and process the data. The process of depositing data into, or withdrawing data from, a data structure is accomplished by the (financial image interchange) *translator*.

X9.46-1997**4.2.4 Financial data considerations**

The following clauses address considerations for financial data.

4.2.4.1 Sending financial data with Images

The images and financial data may be sent together, or separately. However, the financial data (i.e., electronic check exchange data) should be sent in a separate interchange from its associated images. This is recommended primarily because of the importance of the financial data. Because of the relatively large size of interchanges containing images, the processing of interchanges containing both financial data and imaged items may impact adversely the processing time for financial data.

4.2.4.2 Correlation of imaged items to financial data

Financial data shall contain sufficient information to correlate to the imaged items. If using an X9.37 format, the components of an image key can be created from elements of an ECE Bundle record, together with components of the ECE Check Detail record. This is possible only if the institution creating the image is the same as the ECE institution, and the ECE bundles are not broken anywhere prior to receipt by the payor. Therefore, this standard assumes that an intermediary never breaks an ECE bundle.

- The institution creating the image also must have the financial data available to create properly an image key. This is true even if the institution creating the image is not the same as the ECE institution.
- The institution creating the image shall use financial data to create the image key, even if it uses a different:
 - *Sequence number for the image from that of the ECE Item Sequence Number; or*
 - *Date for the image from that of the ECE Business Date.*

In the event it uses a different sequence number, or date, it shall maintain an internal cross-reference to access the image, if needed. The payor bank remains unaffected.

If the institution creating the image uses other procedures, the correlation between the image and the financial data is subject to agreements between the parties. If the correlation between an image and its corresponding financial data is not possible, the payor may use the right of refusal to ask for the paper, or for other arrangements, as stipulated in its Banking Practices Agreement.

4.2.5 Query request considerations

When originating a query request, users should observe the following:

- Multiple requests for the same institution may be sent in the same interchange;
- When an acknowledgment has been requested, a negative acknowledgment is used to indicate that a request failed;

4.2.6 Acknowledgment considerations

Application Acknowledgments resulting from the receiving FII-system-user's failure to accept a Functional Group or a Transaction Set shall always be sent, unless otherwise indicated. The user may expressly request that all Application Acknowledgment types not be sent.

Requested Functional Acknowledgment shall be generated before any Application Acknowledgment is generated, and Application Acknowledgment shall be generated before any response to a query request is generated.

4.2 Summary of business considerations

This clause includes business considerations addressing recommended procedures and practices designed to assist in implementation.

4.2.1 EPC "9" authorization

Only the payor bank shall authorize its customer to use checks printed with a "9" in the EPC field of the MICR line. The presence of the "9" in the EPC field of the MICR line designates a check as a candidate for subsequent image interchange with or without item truncation.

4.2.2 Banking practices agreement

Participants in financial image interchange shall establish a Banking Practices Agreement (BPA). This agreement provides a formal basis for interchange between institutions.

To assist in understanding Banking Practices Agreements, annex C covers the following:

- 1) *Description of a suggested framework for interchange covering presentment and settlement terms, storage and availability of images, and returns, drawing on existing regulations;*
- 2) *A pro forma Banking Practices Agreement formalizing this framework; and*
- 3) *A description of other business, or technical considerations, such as communications method, media used in the interchange, acceptable compression algorithms and imaging parameter options, ASCII or EBCDIC encoding, and image requirements.*

4.2.3 Imaging considerations

The following points address considerations for imaging of items:

4.2.3.1 Images and associated electronic check data

The interchange of check images shall always be predicated upon the financial data. The financial data shall precede, or accompany, the image (and its corresponding item information). The financial data could have arrived hours, days, or even years earlier.

4.2.3.2 Image capture

The institution participating in check image interchange shall capture both the full front and the full back of the item.

4.2.3.3 Image, front and back

The institution participating in check image interchange shall provide the ability to interchange the full front or the full back of the item, or both, in accordance with the Banking Practices Agreement.

4.2.3.4 Accepting images

Payor institutions should accept "usable" images provided according to prior Banking Practices Agreements (see annex C). The payor institution shall have the right to refuse an image, a group of images, or an entire image interchange, if deemed unusable, and request the physical items(s).

X9.46-1997**4.1.4 Acknowledgments**

This standard defines mechanisms for sending and receiving two classes of acknowledgments. One class of acknowledgment advises whether, or not, the syntax of the interchange, or portion of an interchange, is correct. The other class advises whether, or not, the contents of an interchange, or portion of an interchange, is correct.

For detail specification, please see 6.4.3.

4.1.5 Retrievals

This standard defines mechanisms for carrying sufficient information with an image view, or views, to support the retrieval of individual views (e.g. front only, back only), partial views or snippets (e.g. signature, endorsement), and multiple views (e.g. front and back, front, back, and signature).

4.1.6 Cross-referencing images

Cross-referencing mechanisms are provided at two levels in this standard:

- Cross-referencing an imaged item with its associated detail financial data;
The tool for this level is the image key, which accompanies an imaged item as part of the item information. The image key shall be constructed from components of the financial data.
- Cross-referencing components of an interchange with other components of the same interchange, or with components of other interchanges;
The tool for this level is a set of cross-reference data elements. For example, mechanisms are provided for cross-referencing between queries and responses, or between an entire financial data interchange and an imaged item interchange.

4.1.7 Compression algorithm support

Compression of views of items included in an interchange shall use one or more of the following algorithms, and associated parameter options, in accordance with Banking Practices Agreements. For details on supported compression algorithms, please see annex B.

Table 1 - Compression algorithms and parameter options

Compression algorithm	Spatial scan density* (DPI)	Number of gray levels
Uncompressed	80-240 ¹	2,4,16,64,256
CCITT T.6	200-240	2
ISO JPEG Baseline (1 component)	100-200	256
JBIG Baseline, D=0	80-240 ¹	2,16
ABIC	80-240 ¹	2,16

NOTES -

1. Bi-level (2 levels) shall have a spatial scan density greater than or equal to 200 DPI.
2. *DPI is the number of dots per inch.

4.1.1 Financial data

This standard defines mechanisms for sending and receiving financial data, such as an entire ECE. The financial data format is specified in formats such as those defined by X9.37, ECCHO, the Federal Reserve, or the Banking Practices Agreement. For detail specification, see 6.4.1.

4.1.2 Digitized images and associated data

This standard defines mechanisms to exchange a digitized image (or images) of an item, or portions of a digitized image, with associated data. The exchanging of images and data may support forward or return processing, or the response to a query request. It may comprise a single item, or a bundle of items. A bundle of items relates to an associated ECE bundle, or just a set of items sent together. A group of bundles relates to an associated ECE cash letter, or just a set of bundles sent together.

- **Items:** For each item, e.g. check, this standard defines mechanisms for sending and receiving both information about the item (*item information*) and digitized representations of the item. Item information includes such things as the amount of the item, payor bank routing number, and cross reference to the financial data, i.e., image key. Digitized representations of the item include such things as the item's front or back, portions of an image view, or multiples of each.
- **Bundles of Items:** For each bundle of items, the standard defines a mechanism for providing control information, such as amount of bundle, end-point, and number of items in the bundle.
- **Groups of Bundles:** For each group of bundles, the standard defines a mechanism for providing control information similar to that for bundles of items.

For detailed specification, please see 6.4.2.

4.1.3 Query requests

This standard defines mechanisms for sending and receiving query requests. The user application may request item information, views of an item, or both, for one or more imaged items. Several different Query Requests functions are supported:

- "Retrieve by specific key" requests that the receiver (i.e., a user application) return images, item information, or both, for the items identified by an image key, or list of image keys.
- "General search" requests that the receiver return images or item information, or both, for the items which meet all of a set of criteria. The selection criteria may include criteria such as:
 - Business Date, or range
 - Sequence Number, or range
 - Cycle Number, or range
 - Amount, or range
 - Account Number, or range
 - Check Serial Number, or range
 - ECE Routing Number
- "Cancel" requests that the receiver cancel aspects of a previously sent interchange which contained financial data, digitized representations of items, or query request(s).
- "Restart" requests that the receiver restarts a previous query request which had been terminated because some of the specified constraints were exceeded.

For detail specification, please see 6.4.4.

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FII (Financial Image Interchange)	Object
FII-system-user	Octet
FII-translator	ODA (ISO/IEC's Open document
FIIS (Financial Image	Orientation Standard)
FIIP (Financial Image	Page

3.2 Protocol syntax

The following syntax conventions are applied throughout this standard:

- a. *The Backus Naur Form (BNF) syntax is used to specify the FII data structures, data elements, and subelement protocol components. See 6.1.5 for additional details.*
 - *Syntactic entities, i.e., data elements, are denoted by lowercase strings enclosed in angle brackets "<label>" in accordance with X12.6.*
 - *The defined construct on the left side of a statement is separated from the defining right side by two colons and an equal sign "::<=". That is, the statement on the right of "::<=" defines the value of the data element named on the left side of "::<=".*
 - *A vertical bar "|" indicates an "or" condition, or alternative definition in accordance with X12.6.*
 - *Braces "{}" enclose an item which may appear zero or more times in accordance with X12.6.*
 - *Square brackets "[]" enclose optional items in accordance with X12.6.*
 - *Parenthesis "()" identify the size range. The size of the element does not include the element delimiters. If the element is defined to have sub-elements, the size of the element does include the subelement delimiters.*
- b. *Data element BNF names appear in bold when used in in-line text.*
- c. *For more definitive information see X12.6.*

The construct "(xx/yy)" identifies the lower and upper limits of the size range. The size occurs immediately after the <label>

The syntax used in Annex A is generally of the form:

<label> ::= <other label> | <sequence of labels> | <data type> | "value"

4 Summary of standard

This clause summarizes the functions of the standard and business considerations critical to a successful implementation of the standard.

A technical overview appears in clause 5, which introduces the detailed specification contained in clause 6, and is supported by annexes A, B and C. Annex J contains a glossary of terms used throughout this standard. A technical guideline (ANSI/ABA TG15-199x) supports implementation procedures and provides additional overview and explanation.

4.1 Summary of functions

The Financial Image Interchange standard defines the structure for sending and receiving of the following: financial data; digitized images with associated data; query requests; and acknowledgments. It also covers the retrieval of views, cross referencing of images to electronic check exchange (ECE) data, cross referencing within an interchange, and between interchanges, and compression algorithm support.

- [23] X12S 91-690 - 19 91: *Introduction to Electronic Data Interchange* ⁵.
- [24] X12.5 -1994: *Interchange Control Structure (release 003050)* ⁵.
- [25] X12.6 -1994: *Application Control Structure (release 003050)* ⁵.
- [26] X12.58 - 1994: *Security Structures (release 003050)* ⁵.

3. Definitions, terms, and conventions

This section contains terms and definitions used throughout this specification for the purpose of this standard and takes precedence over normal use.

3.1. General terms

The following terms used in this Standard are included in the glossary, annex J of this specification

Adaptive Bilevel Image	Financial data	Partial view
Compression (ABIC)	Financial institution	Pel (picture element)
Bitonal	Grays-scale	Pixel (picture element or pel)
Byte (Octet)	Group 4 (T.6)	Port
Authentication	Huffman coding	Protocol
CCITT	IOCA	Repudiation
Character repertoire	Image (digital image)	Resolution
Character set	Image capture	Run-length encoding
Character string	Item views	Sampling resolution
Check processing data	Image Key	Scaling
CIPS	Image raster data	Scan line
Clipping	Image processing	Services
Continuous tone	Integrity	Snippet
Compression	Interchange	Spatial scan density
Compression algorithms	Interchange format	Supplier
Communication protocol	Interchange protocol	Text
Confidentiality	Interchange structure	Thresholding
Consumer	Interoperate	TIFF (Tagged image file format)
Copy	Item	Transaction
Cropping	Item views	Transaction Set
Data stream	ITU-T (International	Transcoding
Decompression	Telecommunications Union	Translator
Default	Telecommunications	Truncation
Dots per inch (DPI)	Standards Sector)	View
ECCHO	JBIG	View parameters
ECE (Electronic check exchange)	JPEG	View processing data
ECE institution	Local time	Workflow
EDI (Electronic Data Interchange)	Lossless compression	Zone
edi (non-X12 conformant EDI)	Lossy compression	
Envelope	Media	
Facsimile	Message	

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- [9] *CCITT Recommendation X.402 (1988), Data Communication Networks - Message Handling Systems: Overall Architecture* ².

ISO/IEC 10021-1 Standard: Information Processing Systems - Text Communication - Message Oriented Text Interchange System - Part 2: Overall Architecture ³.

2.2 ITU-T/CCITT only standards

- [10] *CCITT T.6 (Group 4) - International Telecommunication Union - CCITT - The International Telegraph and Telephone Consultative Committee Blue Book - Vol. VII - Fascicle VII.3 - Terminal Equipment and Protocols for Telematic Services - Geneva 1989, pp 48-56, ISBN 92-61-03611-2* ².

2.3 ISO/IEC only standards

- [11] *ISO/IEC 7372:1986 - Trade Data Interchange - Trade Data Dictionary* ³
- [12] *ISO/IEC 9735:1987 - Electronic Data Interchange for Administration, Commerce, and Transport (EDIFACT) - Application Level Syntax Rules* ³.
- [13] *ISO/IEC 11166-1 - Banking - key management by means of asymmetric algorithms - Part 1: Principles, procedures, and formats* ³.
- [14] *ISO/IEC 9796 - 1991- Information Technology- Security Techniques - Digital Signature Scheme Giving Message Recovery*

2.4 ANSI standards and technical guidelines

- [15] *X3.92 (1992) Data Encryption Algorithm* ³.
- [16] *X9.7 - 1988: Bank Check Background And Numerical Convenience Amount Field* ⁴.
- [17] *X9.9 - 1994: Financial Institution Message Authentication (Wholesale)* ⁴.
- [18] *X9.13 - 1990: Specifications for placement and location of MICR printing* ⁴.
- [19] *X9.17 - 1995: Financial Institution Key Management (Wholesale)* ⁴.
- [20] *X9.30 - 1995: Public key cryptography using irreversible algorithms for the Financial Services Industry Part 1: The DSA Signature Algorithm* ⁴.
- [21] *X9.37 - 1994: Specifications for Electronic Check Exchange* ⁴.
- [22] *X9/TG-15-199x: X9.15 - 1995: Financial Image Interchange: Technical Guideline [Draft]* ⁴.

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X9 financial industry standards can be ordered from: X9 Order Desk, c/o ABA Customer Service Center, 1120 Connecticut Ave., N.W, Washington, DC 20036, USA. Tel. +1 (800) 338 0628 or + 1 (202) 663-5087. Fax +1 (202) 663-7543. X9 Online address: <http://www.x9.org/x9>.

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2.1 Paired ISO/IEC standards and ITU-T/CCITT recommendations.

- [1] CCITT Rec. X.208(1988): *Abstract Syntax Notation - One* ².
ISO/IEC 8824: *Specification of Abstract Syntax Notation One (ASN.1)* ³.
- [2] CCITT Rec. X.407(1988): MHS: *Abstract Service Definition Conventions* ².
ISO/IEC 10021-3:1990: MOTIS: *Abstract Service Definition Conventions* ³.
- [3] CCITT Rec. T.411-T.419 (1988): *Office Document Architecture* ².
ISO/IEC 8613:1989: *Office Document Architecture* ³.
- [4] CCITT Rec. T.82 (1993) *Coded Representation of Picture and Audio Information - Progressive Bi-Level Image Compression* ².
ISO/IEC 11544, *Coded Representation of Picture and Audio Information - Progressive Bi-Level Image Compression* ³.
- [5] CCITT Recommendation T.81 (1992), *Information Technology - Digital Compression and Coding of Continuous-Tone Still Images, Requirements and Guidelines* ².
ISO/IEC 10918-1: 1993, *Information Technology - Digital Compression and Coding of Continuous-Tone Still Images, Part 1: Requirements and Guidelines* ³.
- [6] CCITT Recommendation T.83 (1994), *Information Technology - Digital Compression and Coding of Continuous-Tone Still Images - Compliance Testing* ².
ISO/IEC 10918-2: 1994, [DIS] - *Information Technology - Digital Compression and Coding of Continuous-Tone Still Images, Part 2: Compliance Testing* ³.
- [7] CCITT Draft Recommendation T.84 (1994), *Information Technology - Digital Compression and Coding of Continuous-Tone Still Images - Extensions* ².
ISO/IEC 10918-3: 1994, [DIS] - *Information Technology - Digital Compression and Coding of Continuous-Tone Still Images, Part 3: Extensions* ³.
- [8] CCITT Recommendation X.208 (1988) *Data Communications Networks - Open Systems Interconnection (OSI) - Model and Notation - Service Definition - Specification of Abstract Syntax Notation One (ASN.1)* ².
ISO 8824 Standard (1987, *Information Processing Systems - Open Systems Interconnection - Specification of Abstract Syntax Notation One (ASN.1)* ³.

² CCITT and ITU recommendations can be ordered from: American National Standards Institute, 11 West 42nd Street, New York, NY 10036, USA, telephone: +1 212 642 4900, fax 1 212 398 0023. ANSI Online address: <http://www.ansl.org>.

³ ISO/IEC and X3 standards can be ordered from: American National Standards Institute, 11 West 42nd Street, New York, NY 10036, USA, telephone: +1 212 642 4900, fax 1 212 398 0023. ANSI Online address: <http://www.ansi.org>.

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1.3. Introduction

Image interchange among financial institutions can only take place on a wide scale with the incorporation of standards. This standard defines the structure which financial institutions shall use to interchange images. Image interchange will occur among a wide variety of financial institutions using an array of hardware and software, for a number of purposes, some of which are not yet known. The image interchange arena will continue to evolve. Although X9 anticipates that future technology will provide imaging structures which are acceptable by all image systems used for financial purposes, the current environment consists of many different technologies that are not necessarily compatible with one another when used to exchange images between financial institutions.

This standard establishes the architectural structure, protocol, and system design for image interchange in this heterogeneous environment. It does not attempt to define business practices, rules, and/or regulations. The standard does require that financial institutions, and intermediaries, entering into exchange of images will establish formal banking practices agreements that define, for their own purposes, acceptable image quality, time frames, liabilities, right of refusal, penalties, etc. Annex C is included for informational purposes to provide a framework for parties entering into image interchange, concerning areas that should be addressed by a banking practices agreement. The importance of these agreements cannot be overly emphasized. The activity of exchanging a Financial Image Interchange which conforms to this standard is based on existing regulations, e.g., Uniform Commercial Code (UCC) and the Federal Reserve's Regulation CC.

Also assumed is every financial institution's commitment to quality images. Quality images require the use of checks designed to meet the specifications stated in X9.7-1988. When introducing image related products to their customers, financial institutions should clearly explain the requirement to use approved check designs and customer liabilities for failure to do so.

The electronic data interchange (edi) format provides a structure to carry financial data, compressed image data, and descriptive data. The financial data, e.g. posting-related data, may be conveyed in the interchange as binary information. The standard offers the opportunity to request one or more views of all, or a portion of one or more, imaged items in an quasi-interactive interchange. As such, the standard provides for the application to be operated according to normal transaction processing practices, be request driven, or both.

The Financial Image Interchange structure specified in this document supports the capabilities and functions identified above. This standard is primarily intended to enable the interchange of check images among financial institutions. For the interchange of check items, the standard specifies that the imaged check should contain a "9" in the EPC field and that a banking practices agreement shall exist among trading partners. It also specifies the interchange syntax, and the image parameter options (such as compression algorithms) which are supported.

2. Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this American National Standard. At the time of publication, the editions indicated were valid. All referenced documents are subject to revision and in general, parties to agreements based on this American National Standard are encouraged to investigate the possibility of applying the most recent edition of those documents referenced below. Members of ISO/IEC maintain registers of currently valid International Standards. In the US, ANSI is the ISO/IEC member. The ITU Secretariat maintains a list of currently valid CCITT/ITU-T Recommendations. The ANSI Secretariat maintains a list of valid ANSI Standards.

1. Scope and introduction

1.1. Scope

This document defines a standard electronic data interchange (edi¹) structure (protocol) that can be used to exchange electronic digitized images of financial documents (e.g. checks) among the different financial institutions involved in a payment transaction. This standard uses *edi* to enable the exchange across diverse computing platforms. It specifies the MICR identifier to be placed on a document that is eligible to be truncated, i.e., the physical item may be retained at the first image system institution, and its image may be transmitted to the paying institution in lieu of the actual physical document. It identifies the various image parameter options (such as, compression algorithms, spatial scan densities, and levels of gray) that this standard supports, and offers the open-ended opportunity for expansion of these as development continues in this field. This standard further supports the exchange of imaged items by providing mechanisms for conveying financial data structures which are defined external to this standard. Also, it defines a query protocol that may be used to request specific imaged items, or to request groups of imaged items being held in another institution's image storage facility. Furthermore, this standard facilitates end-to-end, self contained, confirmed services by including two levels of acknowledgments: syntax checking acknowledgments, and application acceptance or rejection acknowledgments. User applications may also utilize the defined security mechanisms which are designed to provide authentication, non-repudiation, and data protection services. It is also anticipated that the standardized formats will be used beyond the limits of the standard, and will facilitate the interchange of user defined data, and non-check items.

This standard emphasizes that the commercial usage of its technology is dependent upon the establishment of formal Banking Practice Agreements between participating institutions.

For electronic check exchange, this standard uses references and examples from X9.37-1994. Other references and examples are considered to be outside the scope of this standard.

NOTE - If X9.37 is not used between institutions for the exchange of Electronic Check Exchange data, then a local mapping of the standardized data elements to the non-X9.37 format for electronic check exchange should be developed by those users.

1.2. Purpose

This standard is intended to improve the payments system by supporting the interchange of digitized images of financial documents, specifically checks and similar paper-based instruments; facilitate the truncation of the paper at the earliest possible point in the clearing process; and support transmissions from a single transaction to many transactions serving banking payment processing applications.

The standard may also be used in support of deferred paper delivery, interactive interchange, or other variations as agreed upon by the exchanging parties.

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To accommodate X12, this standard refrains from using the term "EDI". X12 requires that if the term *EDI* is used, then all data elements, data segments, transaction sets, and functional groups are defined in X12.22 (i.e., the X12 data dictionary.) Since many of the data elements and data segment definitions specified in this standard are not defined in the X12 data dictionary, the term *FI* or "*edi*" is used throughout this standard.

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Work Group 9 would like to offer special thanks to John Driscoll (Bank of America) who was the Work Group's first chair. It would also like to recognize three subgroup chairs: Wayne Doran/Architecture (NCR), Tom Hayosh/Compression Techniques and Testing (Unisys) and Helene Kontonis/User Requirements (Chase) for their efforts. Finally, the Work Group would like to offer thanks to Dick Jesmajian and Yitzhak Ronen (AT&T Bell Laboratories) for their fine efforts as Technical Editors in putting together a very complex document.

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Under ASC X9 procedures, a working group may be established to address specific segments of work under the X9 Committee or one of its subcommittees. A working group exists only to develop standard(s) or guideline(s) in a specific area and is then disbanded. The individual experts are listed with their affiliated organizations. However, this does not imply that the organization has approved the content of the standard or guideline. (Note: Per X9 policy, company names of non-member participants are listed only if, at time of publication, the X9 Secretariat received an original signed release permitting such company names to appear in print.)

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Financial Image Interchange Protocol Standard

Foreword

At the end of World War II, it became evident that practices for check processing could not adequately accommodate the growing volume of financial transactions in an expanding national economy. A method to reduce significantly the manual labor associated with the check-clearing system, that would at the same time increase the speed with which transaction could be settled, was required. Magnetic Ink Character Recognition (MICR) was the method selected to achieve these goals, and that technology, with refinements and improvements made during the intervening forty years, permitted the payment system to keep pace with the growth of transaction activity which is now over one hundred times larger than it was at mid-century.

As the end of the twentieth century approaches, we are faced with the challenge of improving the check processing and clearing process to achieve greater efficiency, to effectively manage costs, and to support new financial institution products and services. These demands exceed any foreseeable improvement in the present MICR system for handling paper-based transaction records, and once again, leading-edge technology is being called upon to provide a means to overcome this hurdle. Digital imaging is expected to be the method that will provide this next step in system improvement. Once converted to digital image form, paper checks need no longer be manually (or mechanically) handled or transported. Thus, both cost of processing and time required should improve substantially.

Because paper documents, principally checks, are the starting point, it is anticipated that financial institutions will handle both digital image and physical paper during a potentially lengthy transition period.

It is also anticipated that image systems may be called upon to generate and exchange data representing items not presently identified as "checks". For these reasons, this standard has been structured in such a way that permits the present MICR system to continue in general use, without limiting expansion of new image technology.

This standard contains 10 annexes. Annexes A and B are normative (integral part of the standard). Annexes C, D, E, F, G, H, I, and J are informative (provided for information purposes only).

Suggestions for improvement of this standard will be welcome. They should be sent to the X9 Secretariat, American Bankers Association, 1120 Connecticut Avenue, NW., Washington, DC 20036.

This standard was processed and approved for submission to ANSI by the Accredited Standards Committee X9 Financial Services. Committee approval of this standard does not necessarily imply that all committee members voted for its approval. At the time it approved this standard, the X9 committee had the following members:

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American National Standard

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**American National Standard
For Financial Image Interchange:
Architecture, Overview, and
System Design Specification**

Secretariat

American Bankers Association

Approved January 21, 1997

American National Standards Institute, Inc.

Abstract

This standard defines an open electronic data interchange (edi) protocol for use by the financial industry in the exchange of imaged items and financial data across a heterogeneous computing environment. In accordance with the user requirements and system overview specified herein, and supplemental Technical Reference Guide, this standard specifies an architecture and system design for the end-to-end exchange of digitized images of financial documents. The data structures, and data elements, are defined according to X12.5 and X12.6 Electronic Data Interchange principles, and syntax, for engaging in electronic financial commerce. This standard also supports the ability for users to request views of an imaged item from cooperating financial institutions, as well as a means to acknowledge receipt of a Financial Image Interchange at the interchange, or component levels of the interchange. It also provides a means for digitally signing transaction sets, and their contents, as well as canceling outstanding query requests and aspects of previously sent interchanges.

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